

FIG. 1A

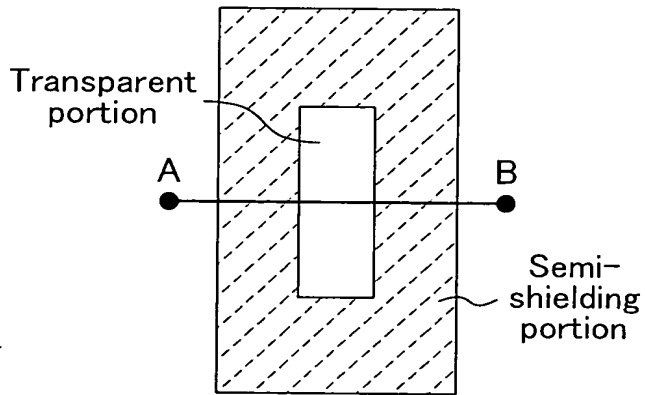


FIG. 1B

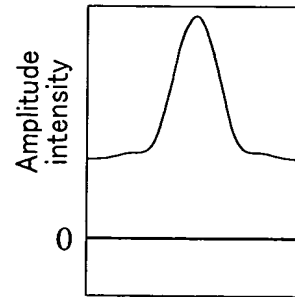


FIG. 1C

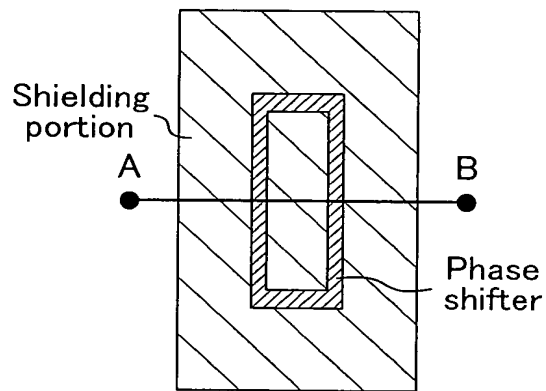


FIG. 1D

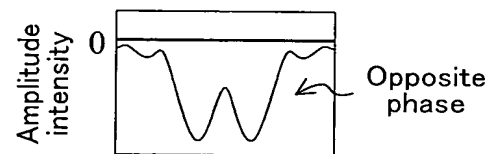


FIG. 1E

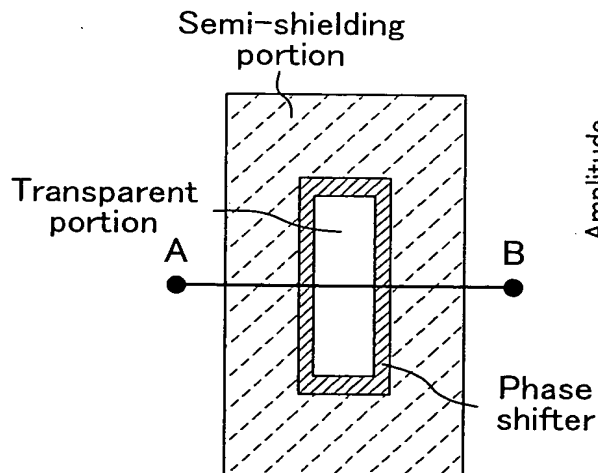


FIG. 1F

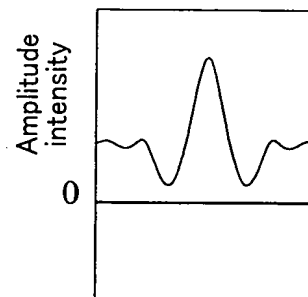


FIG. 1G

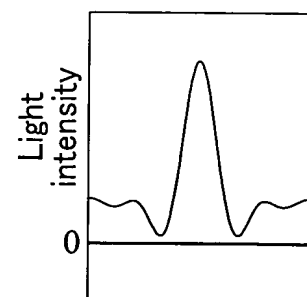


FIG. 2A

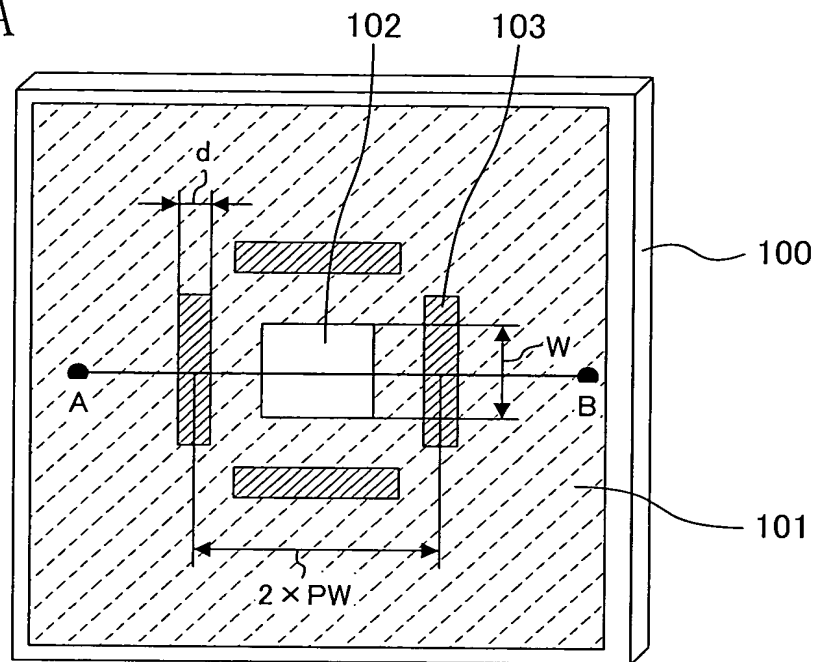


FIG. 2B

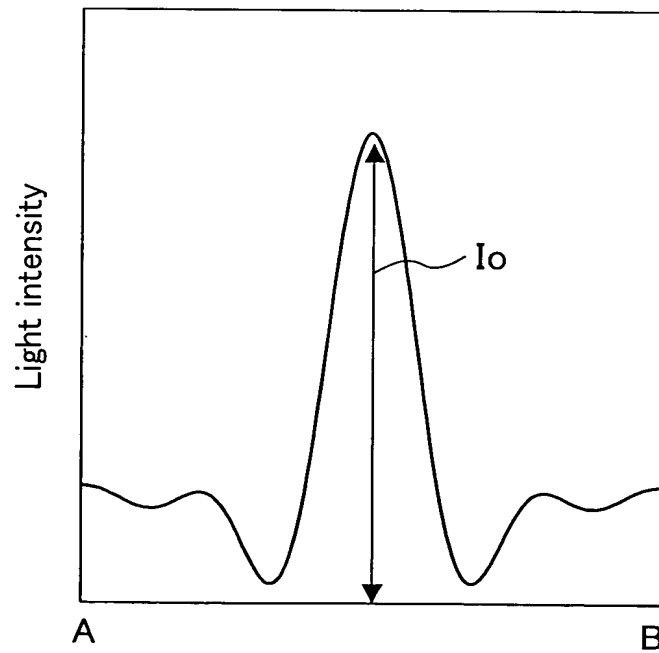


FIG. 3A

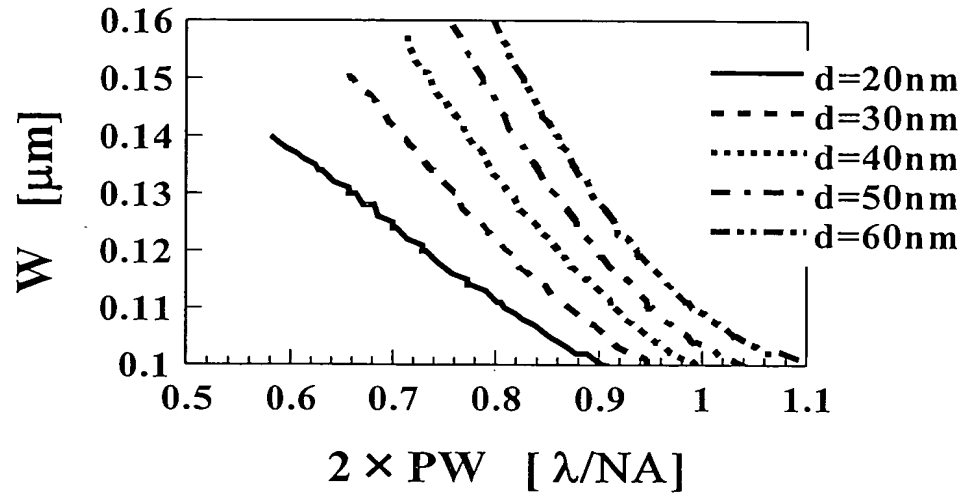


FIG. 3B

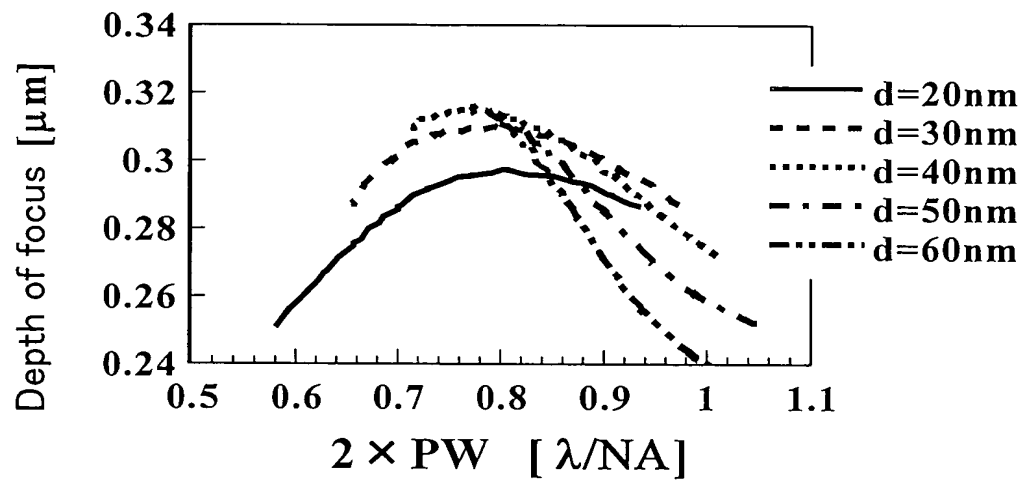


FIG. 3C

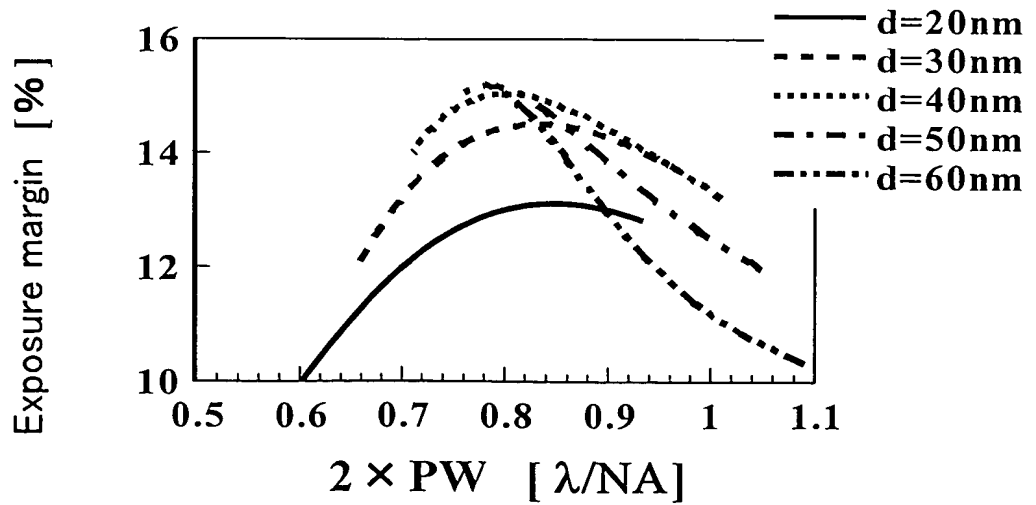


FIG. 4A

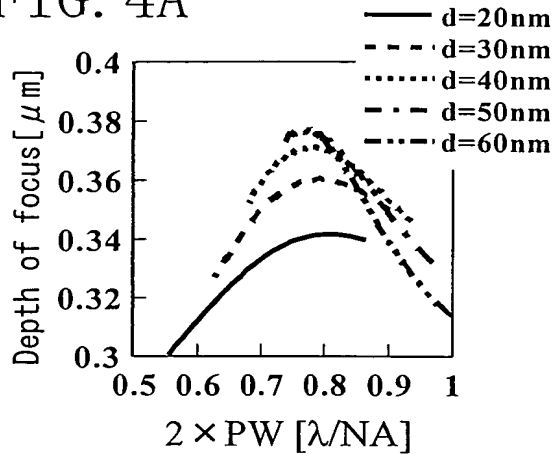


FIG. 4B

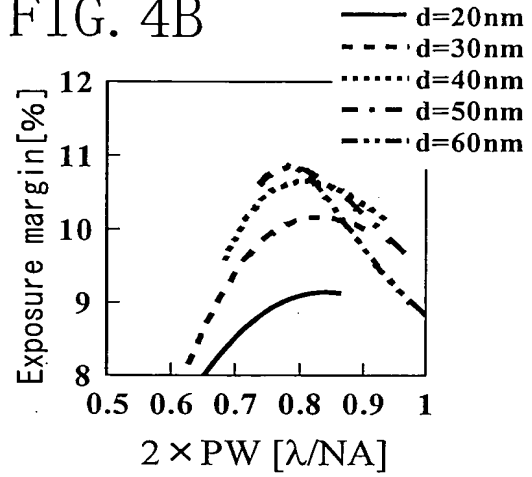


FIG. 4C

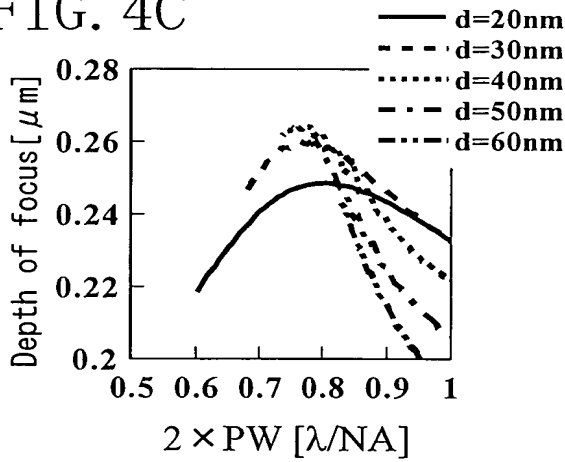


FIG. 4D

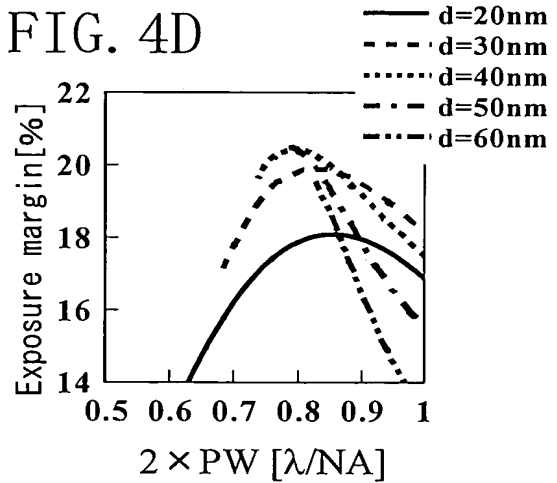


FIG. 4E

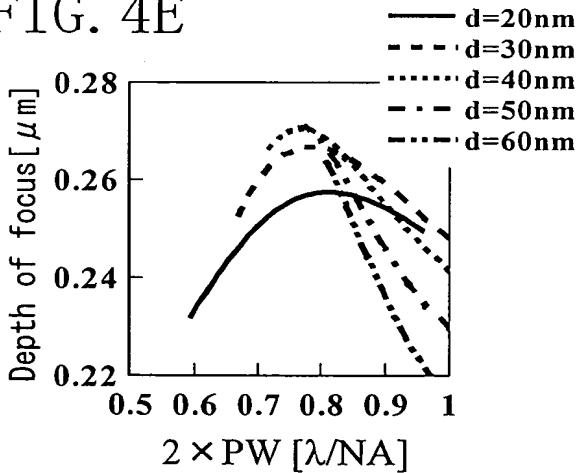


FIG. 4F

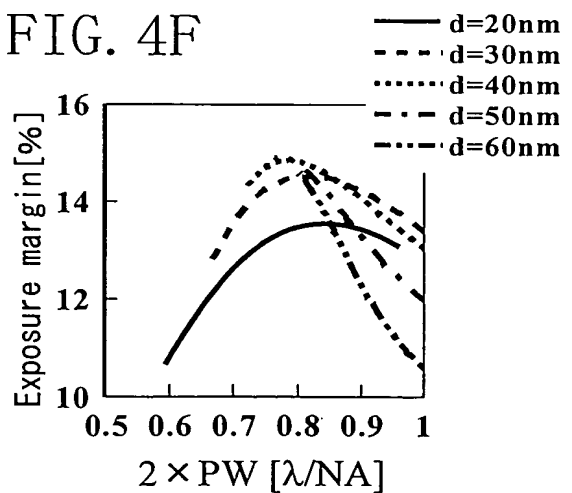


FIG. 5A

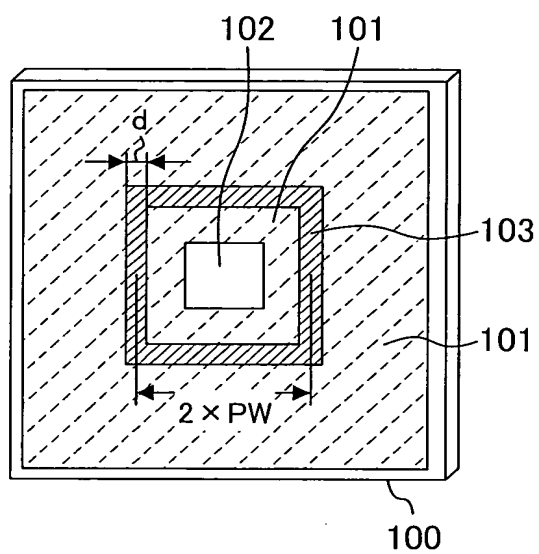


FIG. 5B

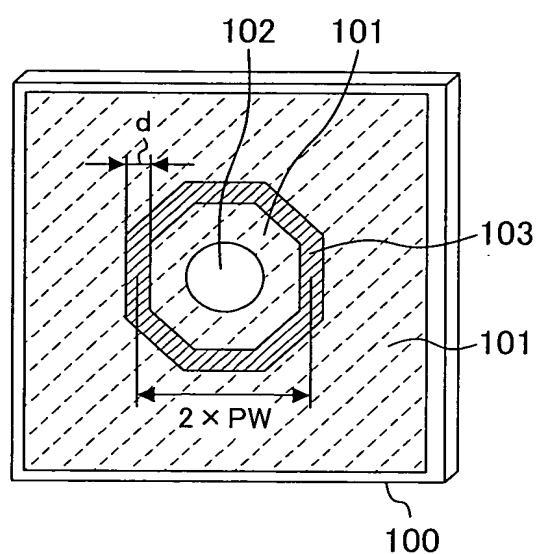


FIG. 5C

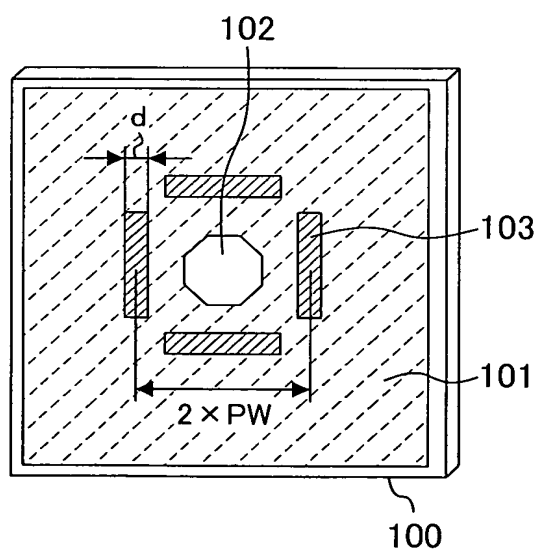


FIG. 5D

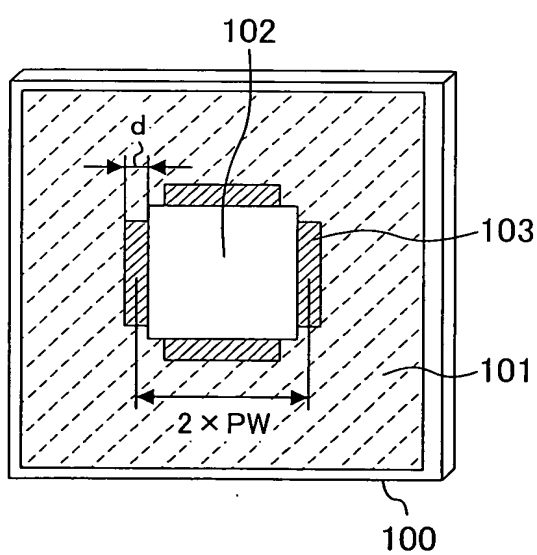


FIG. 6A

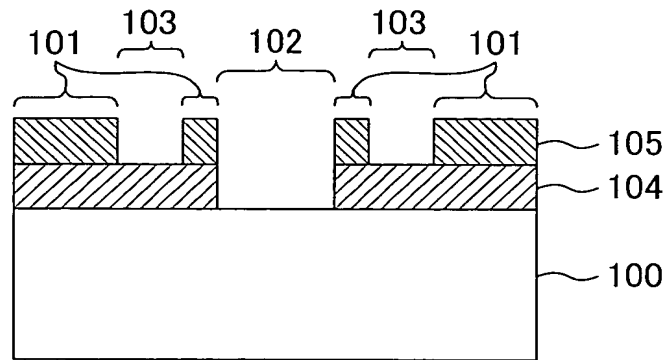


FIG. 6B

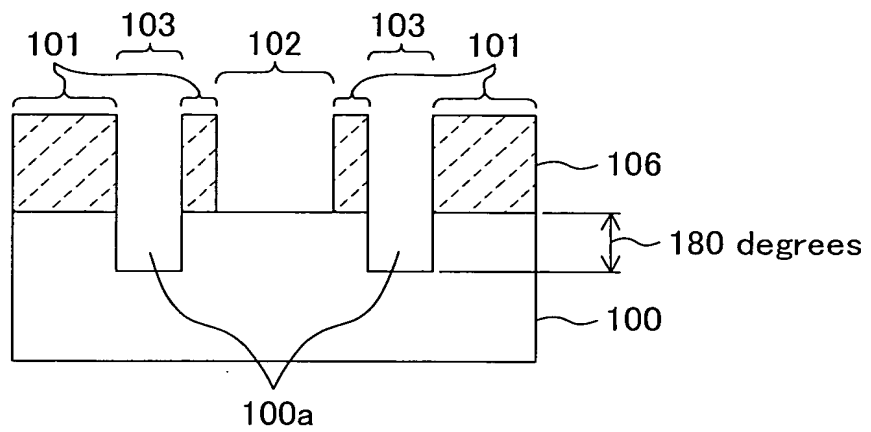


FIG. 6C

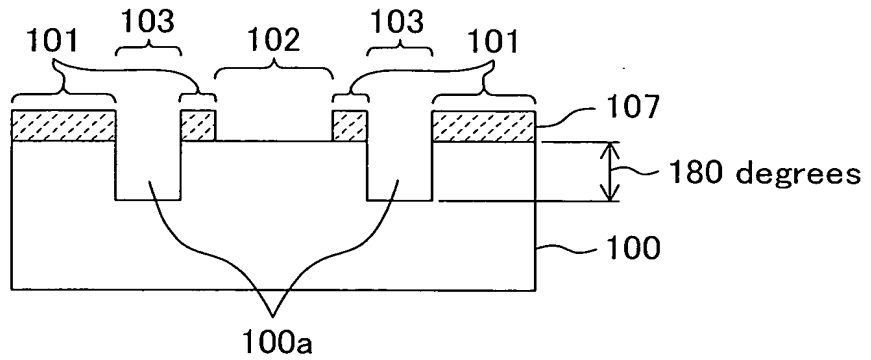


FIG. 6D

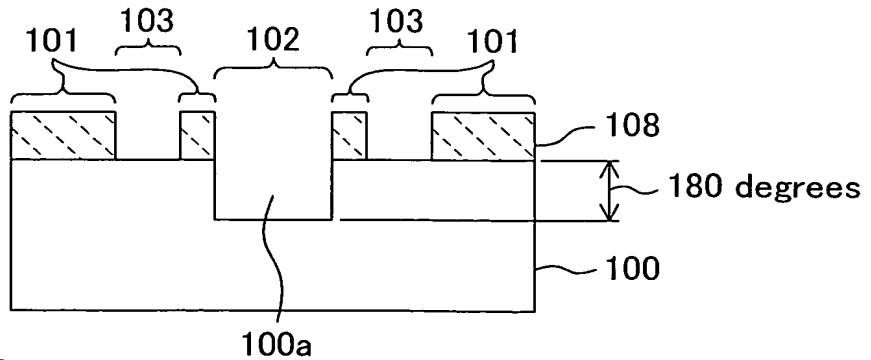


FIG. 7A

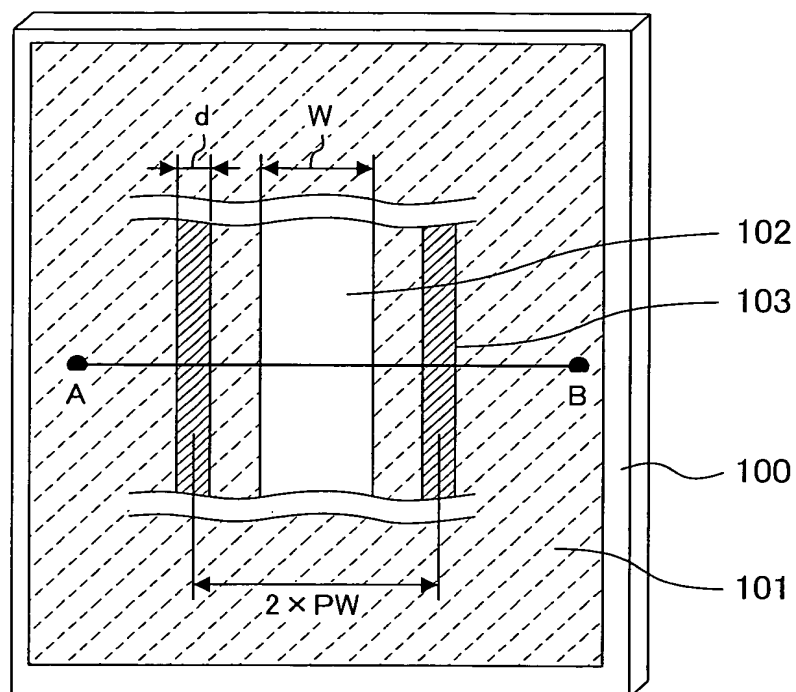


FIG. 7B

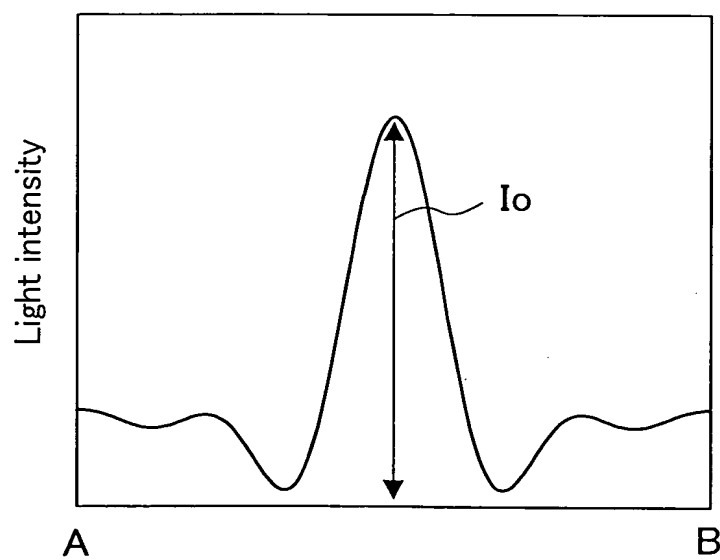


FIG. 8A

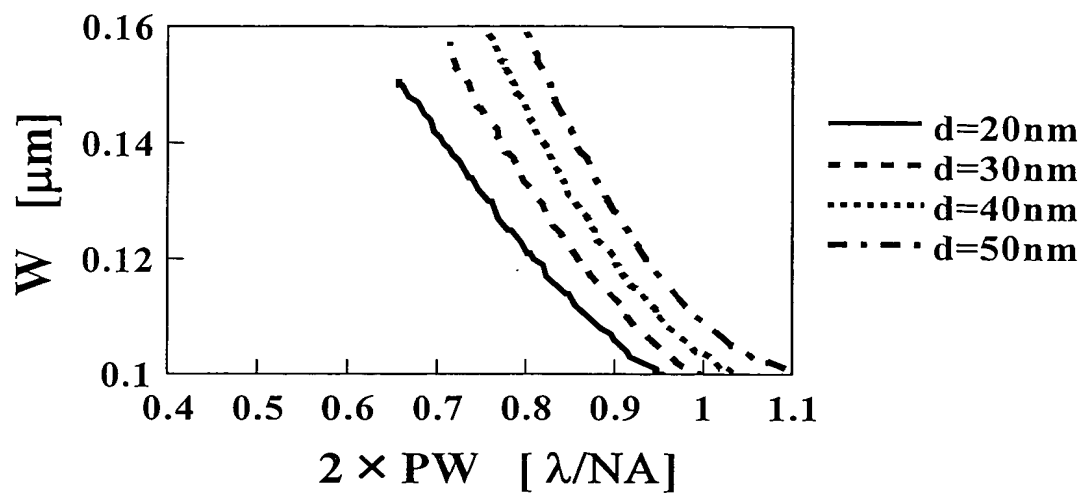


FIG. 8B

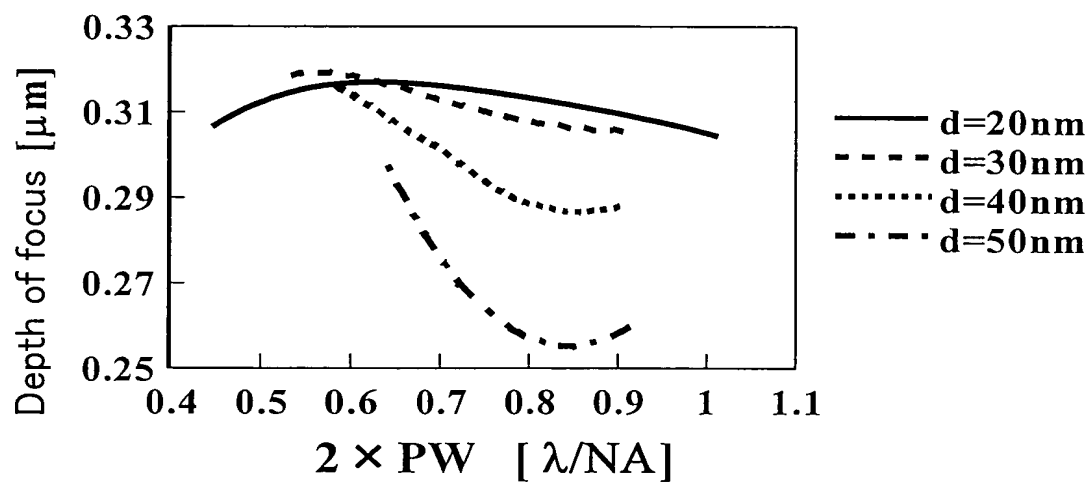


FIG. 8C

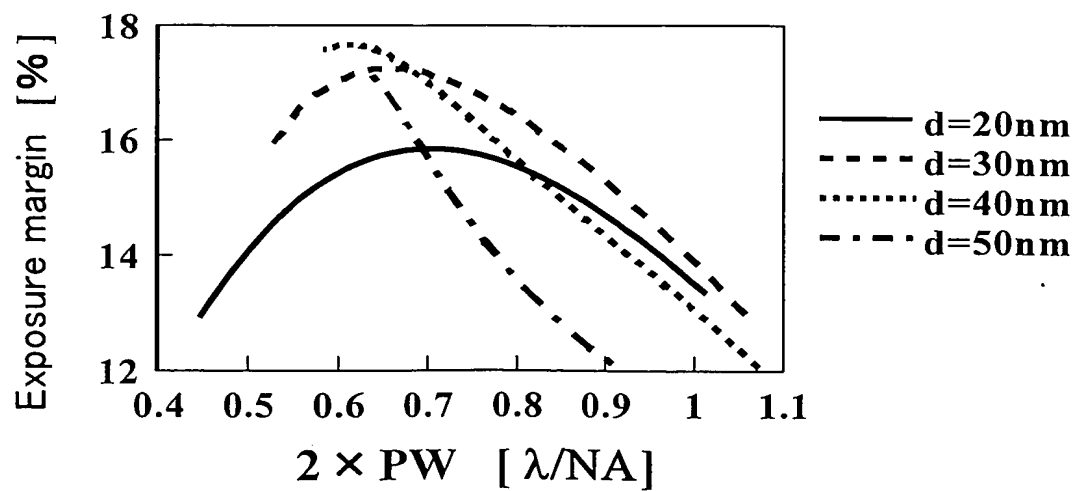




FIG. 9A

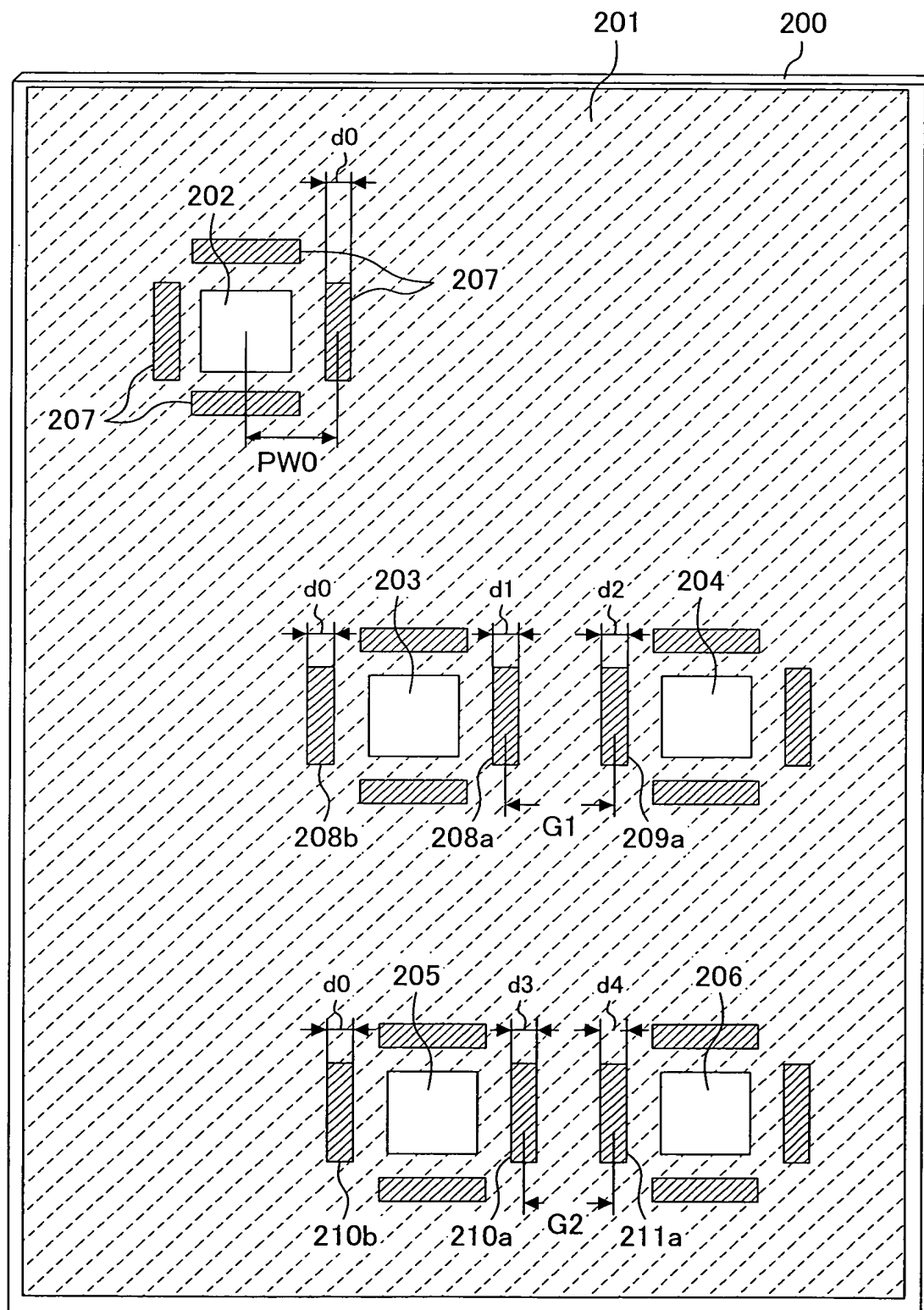


FIG. 10A

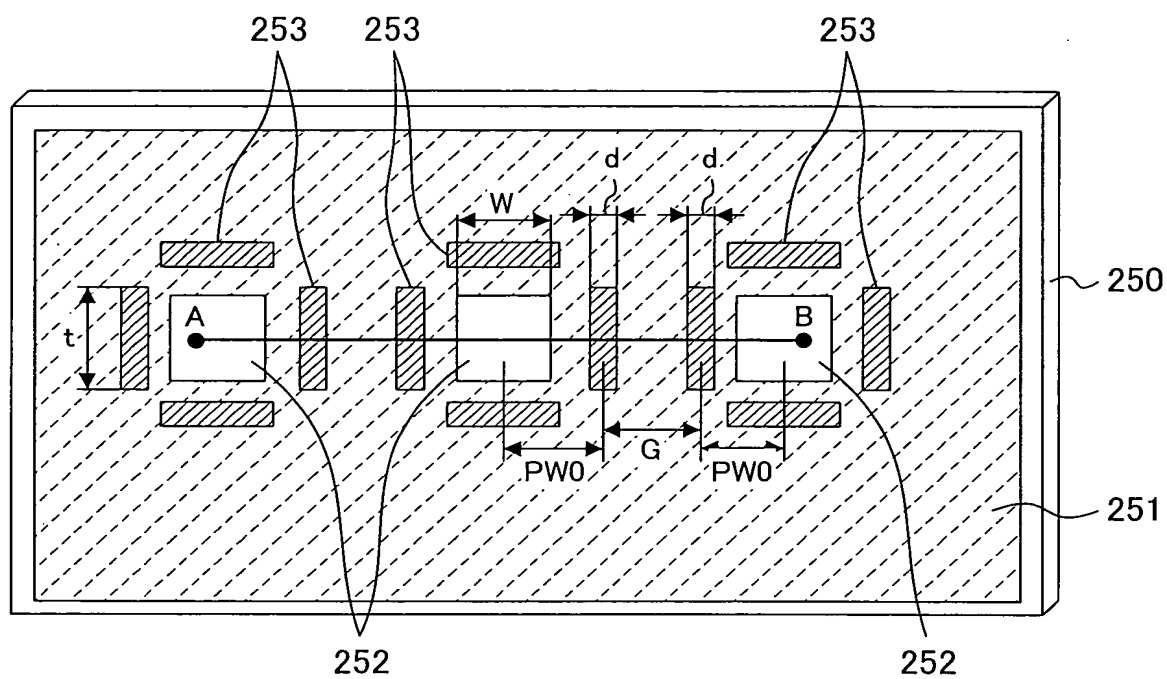


FIG. 10B

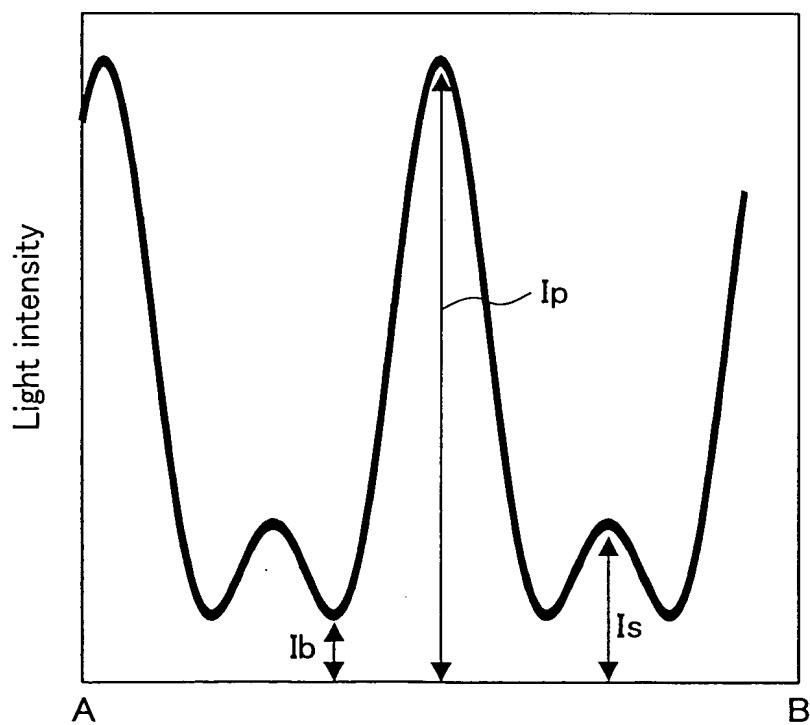
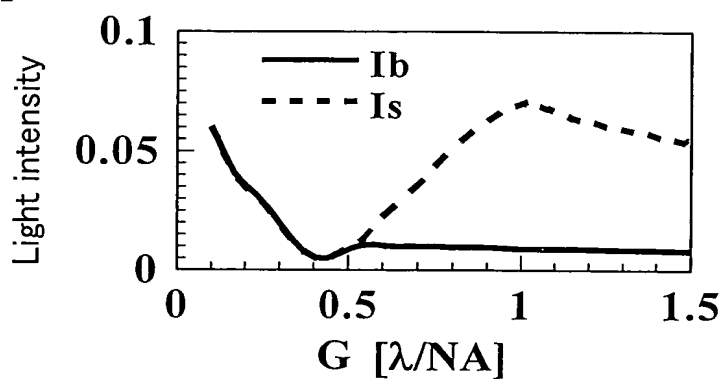


FIG. 11A



Optimization of width of  
phase shifter

$$G < 0.5 \times \lambda/NA$$

$$d = d_0 \times (0.5 + G) / (\lambda/NA)$$

FIG. 11B

$$G = 0.3 \times \lambda/NA$$

$$d = 0.8 \times d_0$$

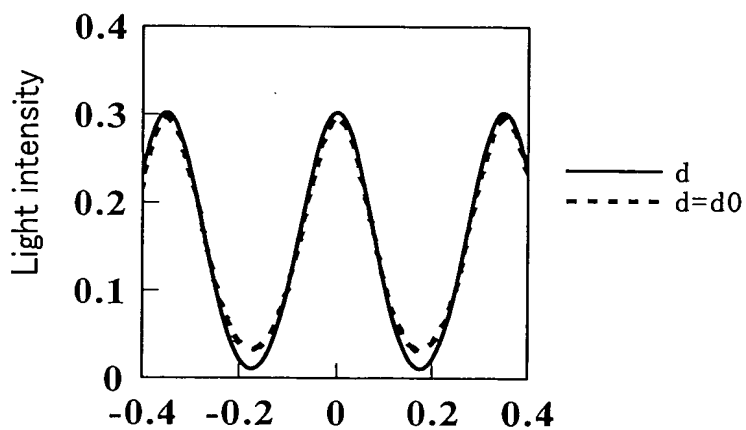


FIG. 11C

$$G = 0.2 \times \lambda/NA$$

$$d = 0.7 \times d_0$$

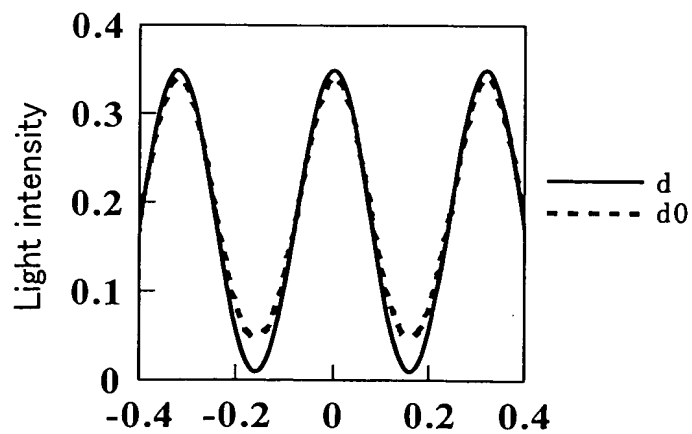
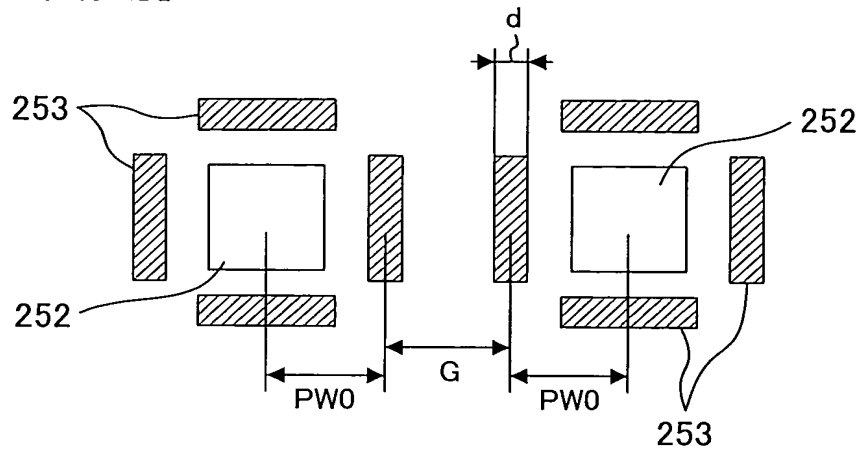
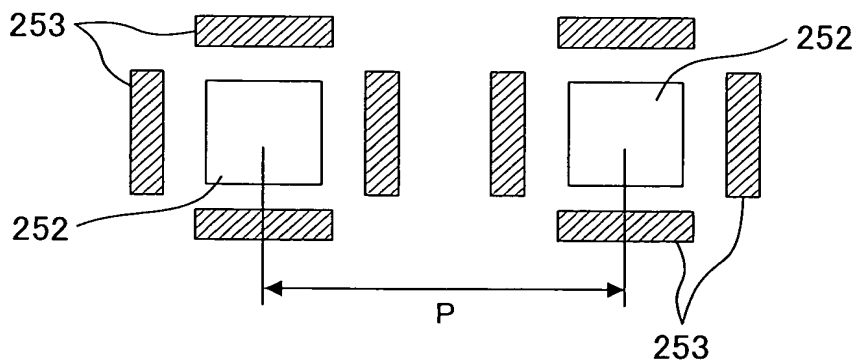


FIG. 12A



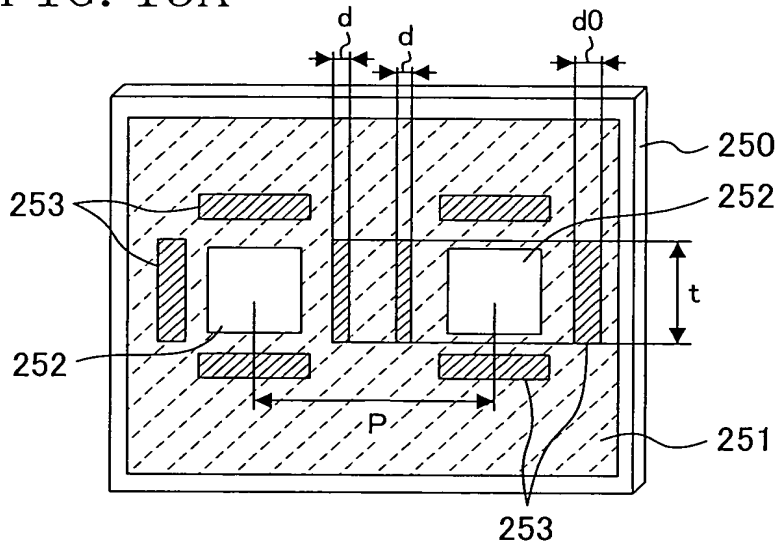
Optimum value of  $PW0$ : obtained when  $0.4 \times \lambda / NA$  and  $G < 0.5 \times \lambda / NA$  with  $d$  set to small value

FIG. 12B



Since  $P = 2 \times PW0 + G$ ,  $P < 1.3 \times \lambda / NA$  with  $d$  set to small value

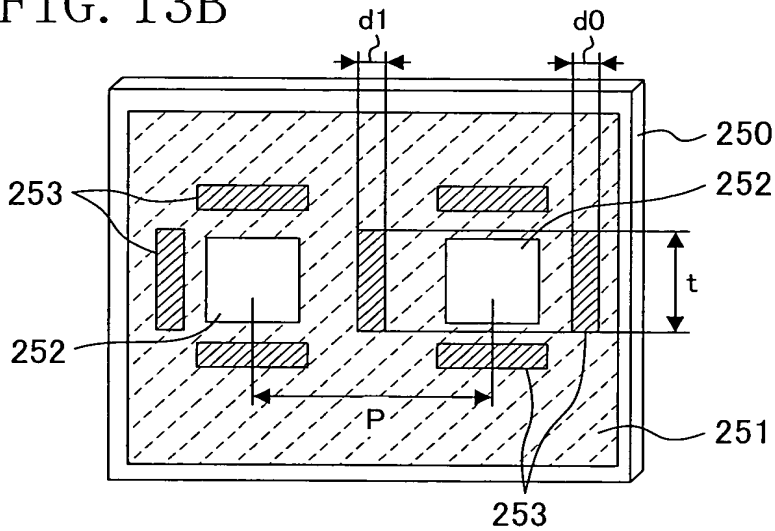
FIG. 13A



$$P < 1.3 \times \lambda / NA$$

$$d < d_0$$

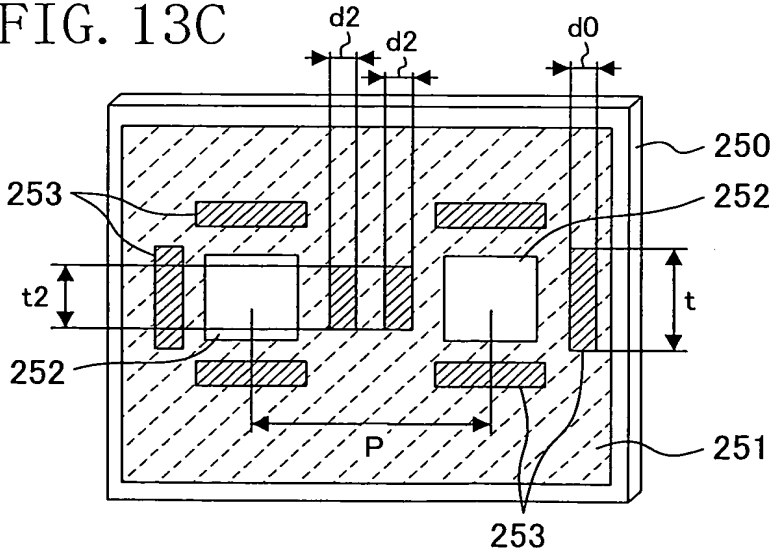
FIG. 13B



$$P < 1.3 \times \lambda / NA$$

$$d_1 < 2 \times d_0$$

FIG. 13C



$$P < 1.3 \times \lambda / NA$$

$$t_2 \times d_2 < t \times d_0$$

FIG. 14A

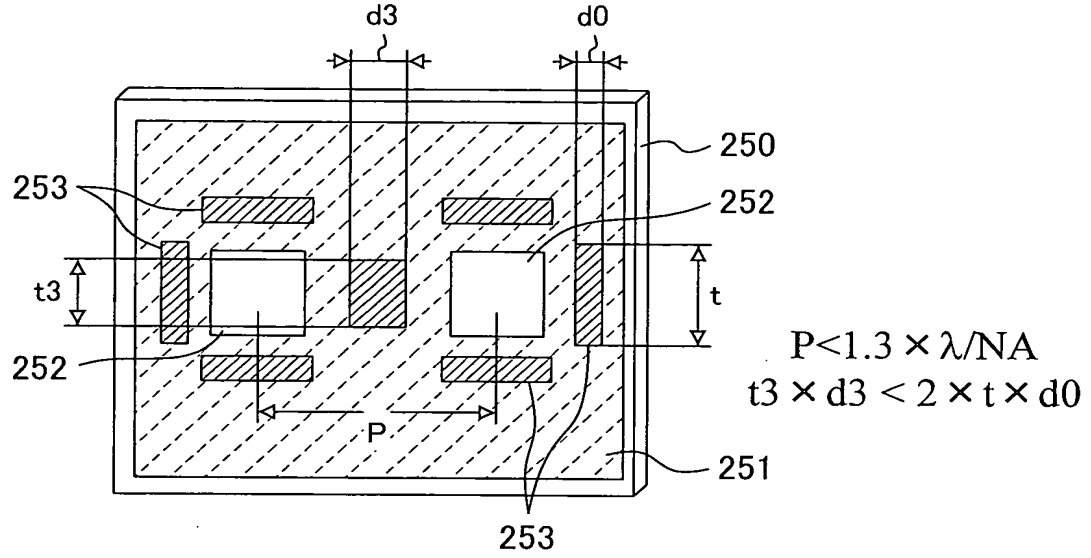


FIG. 14B

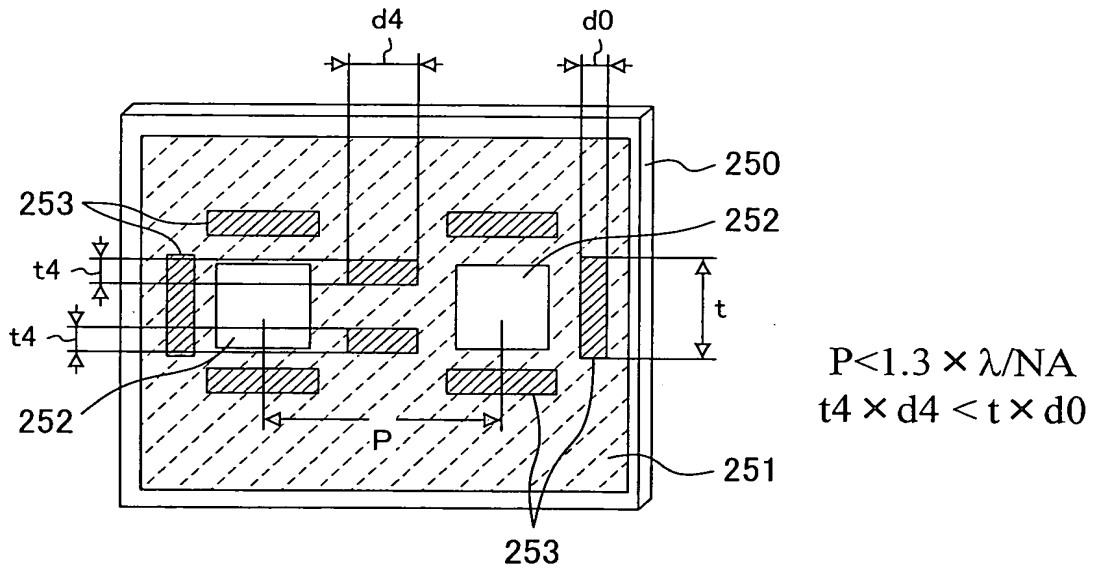


FIG. 15

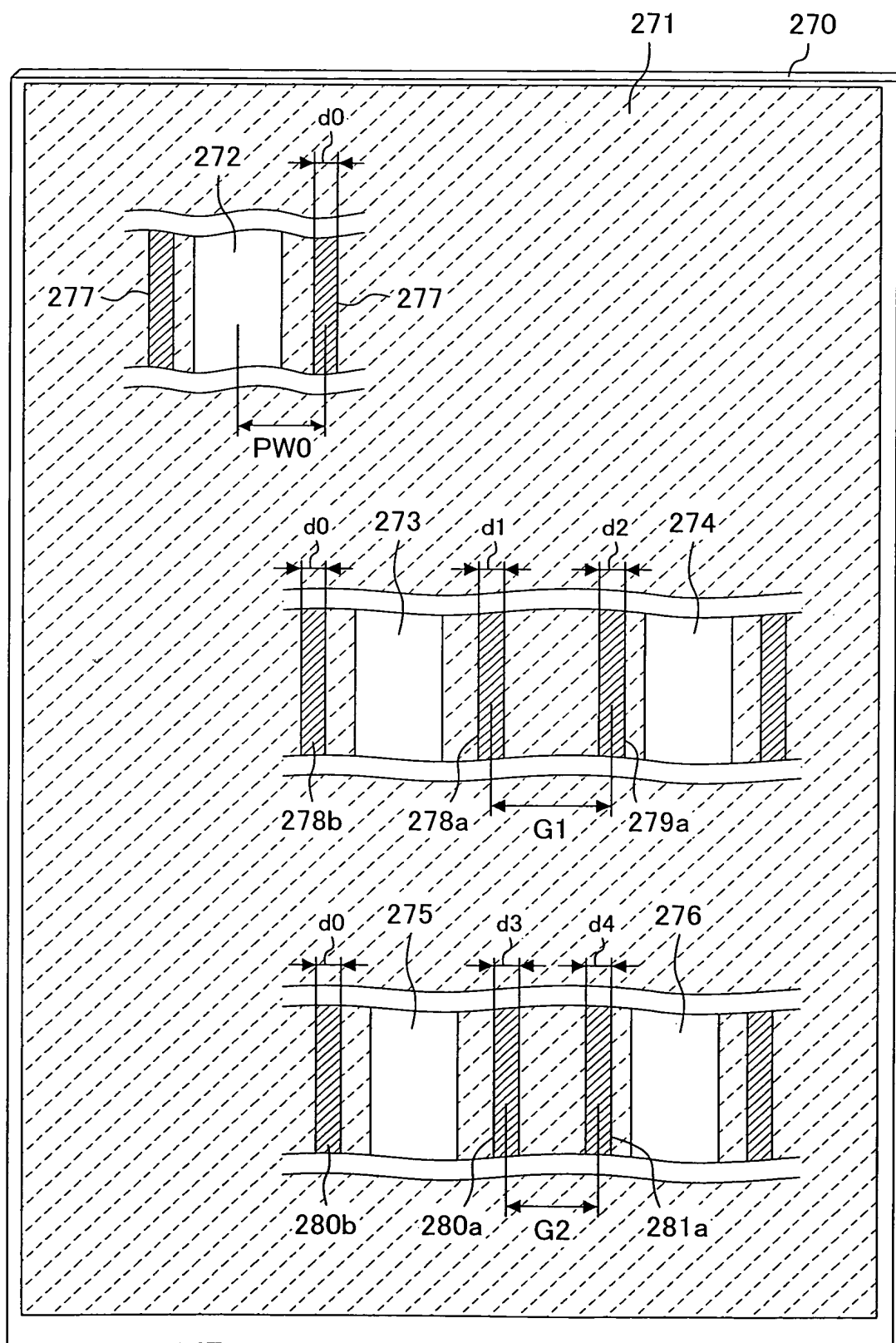


FIG. 16A

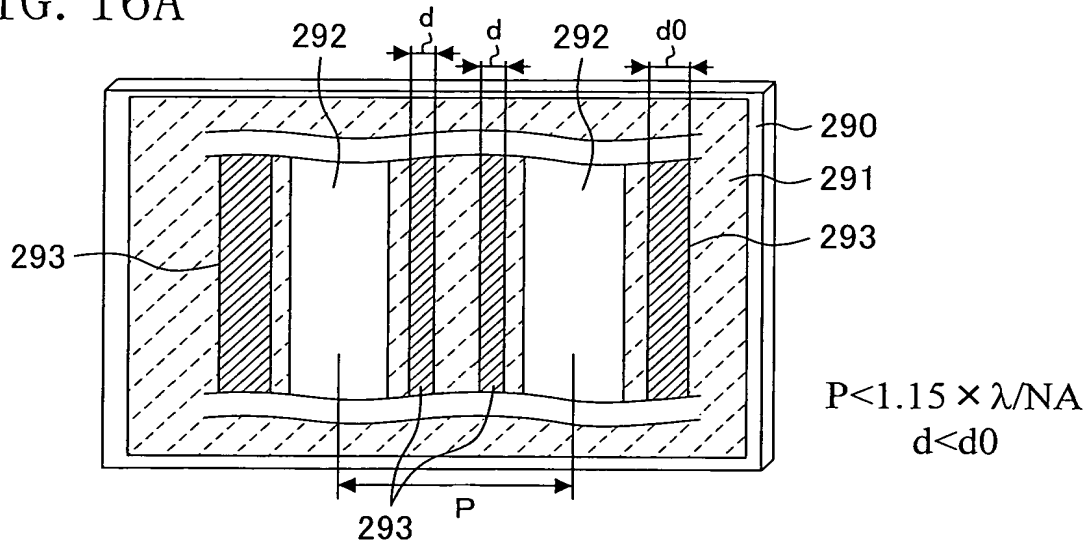


FIG. 16B

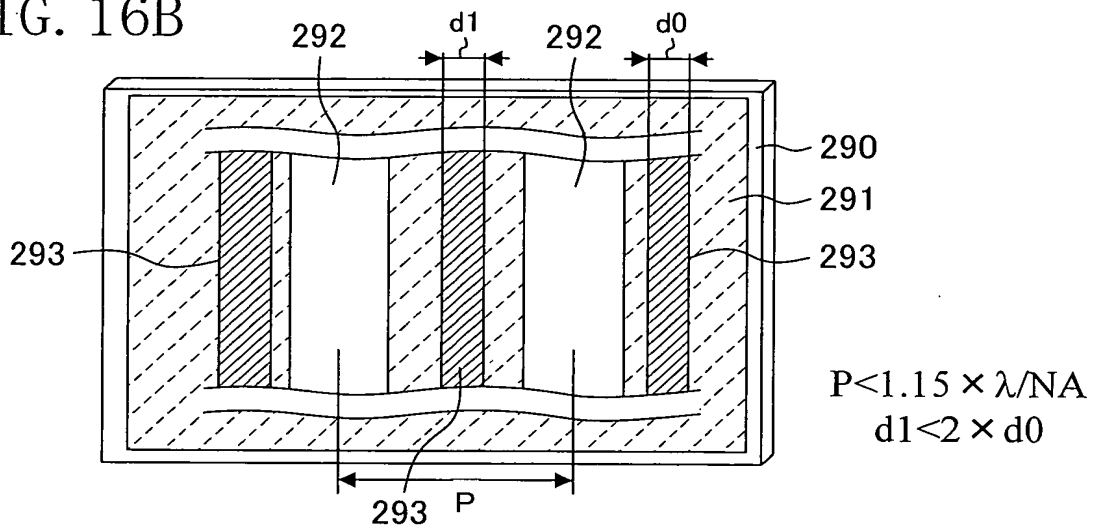


FIG. 16C

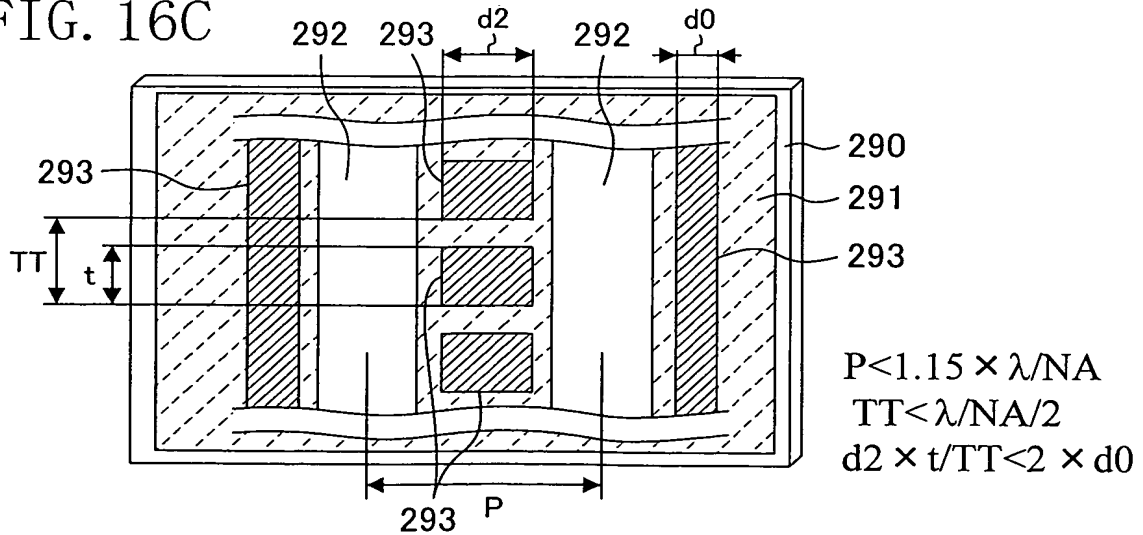




FIG. 17

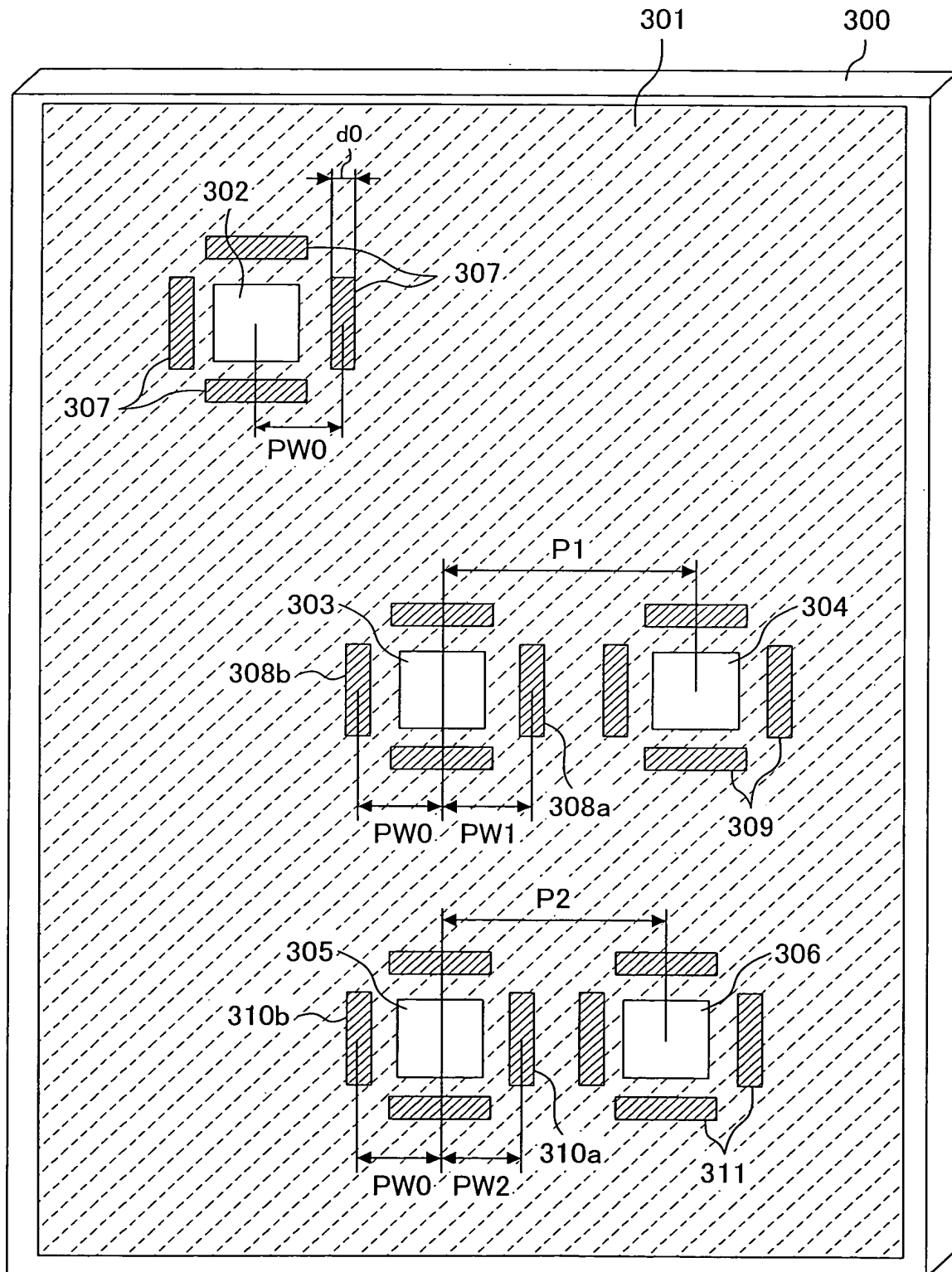


FIG. 18A

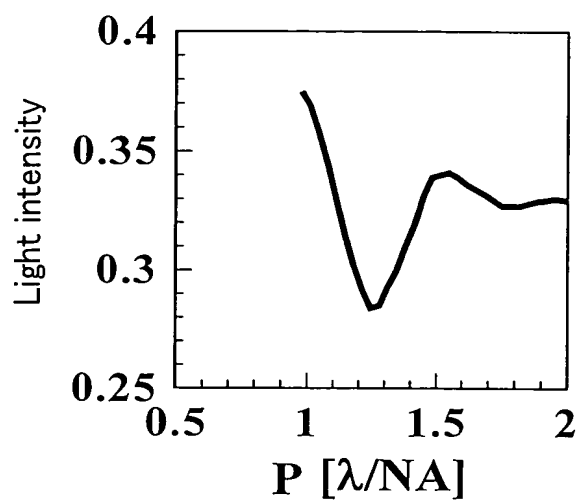


FIG. 18B

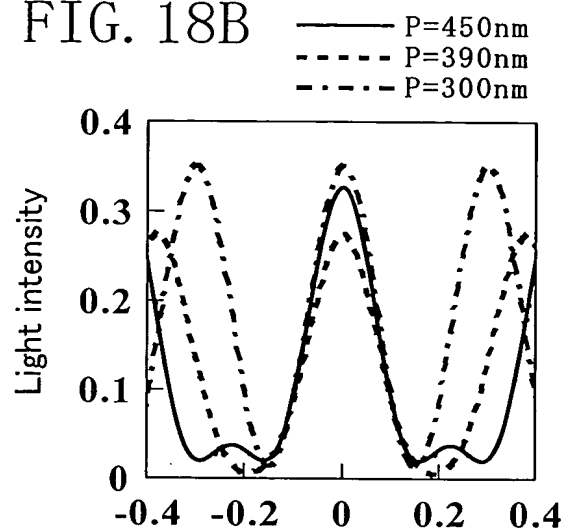


FIG. 18C

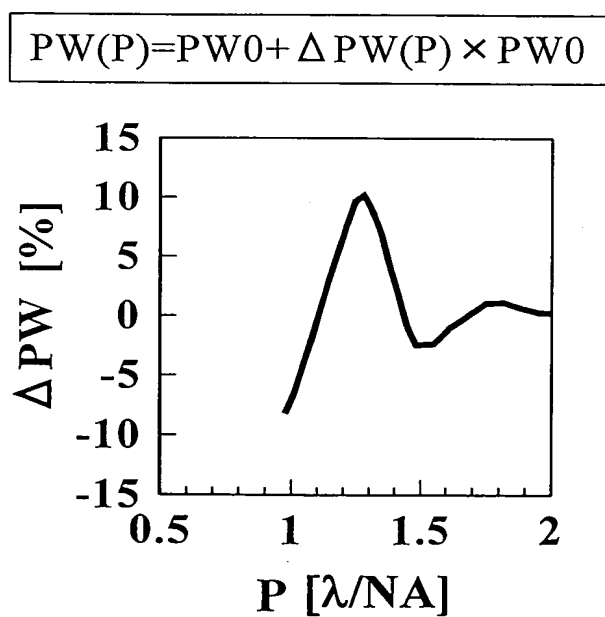


FIG. 18D

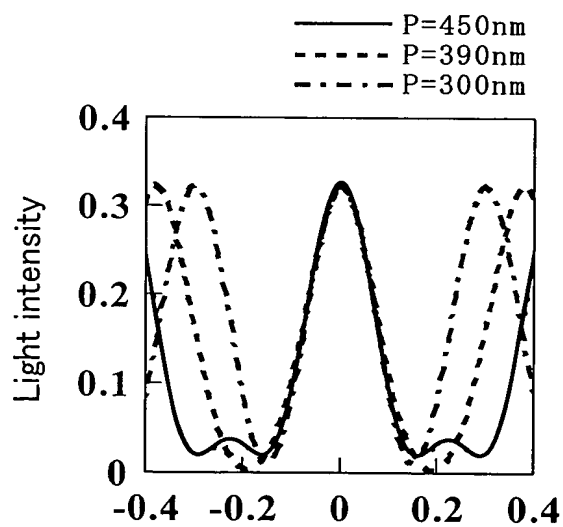


FIG. 19

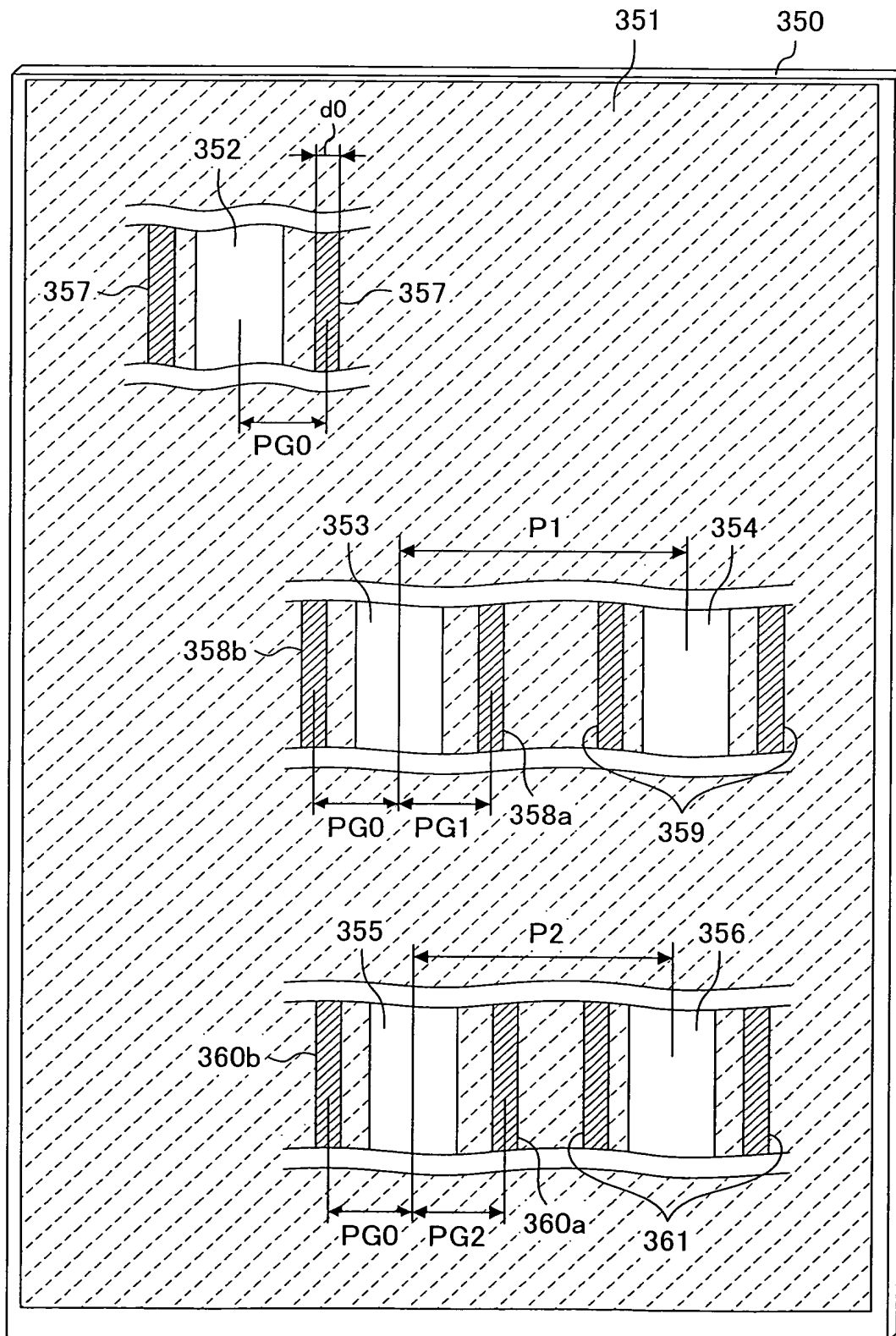


FIG. 20A

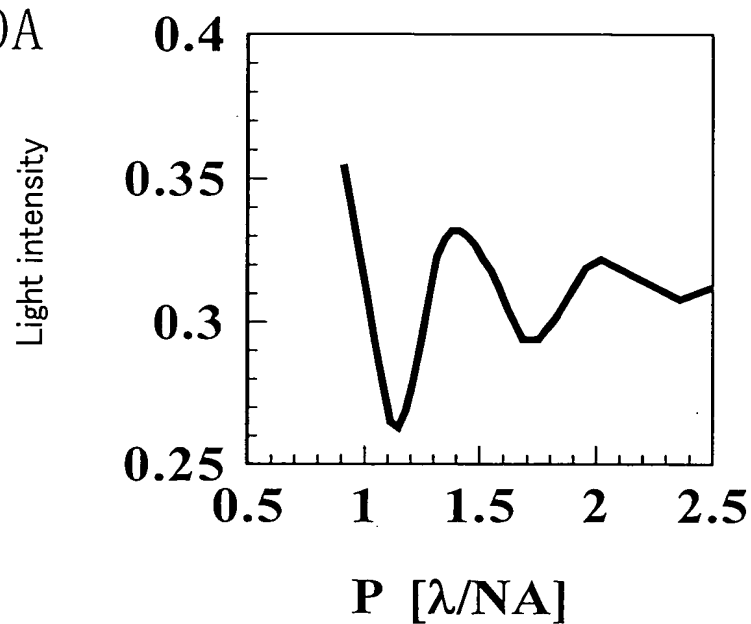


FIG. 20B

$$PW(P) = PW0 + \Delta PW(P) \times PW0$$

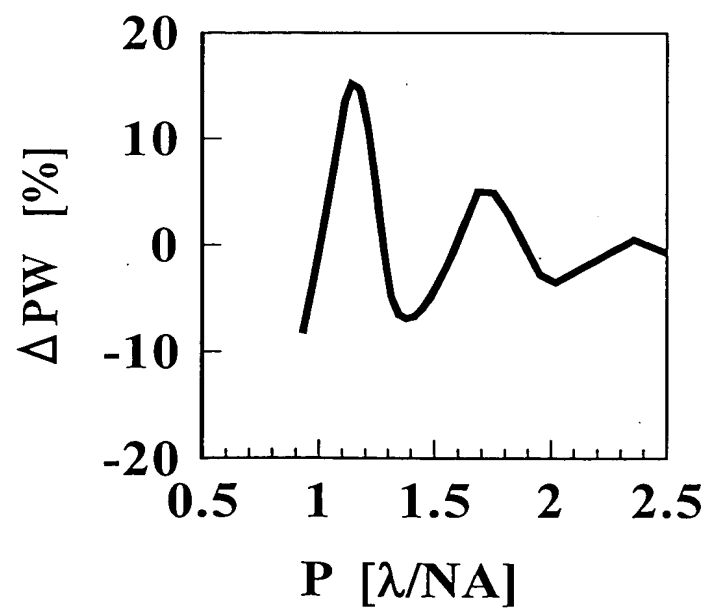


FIG. 21A

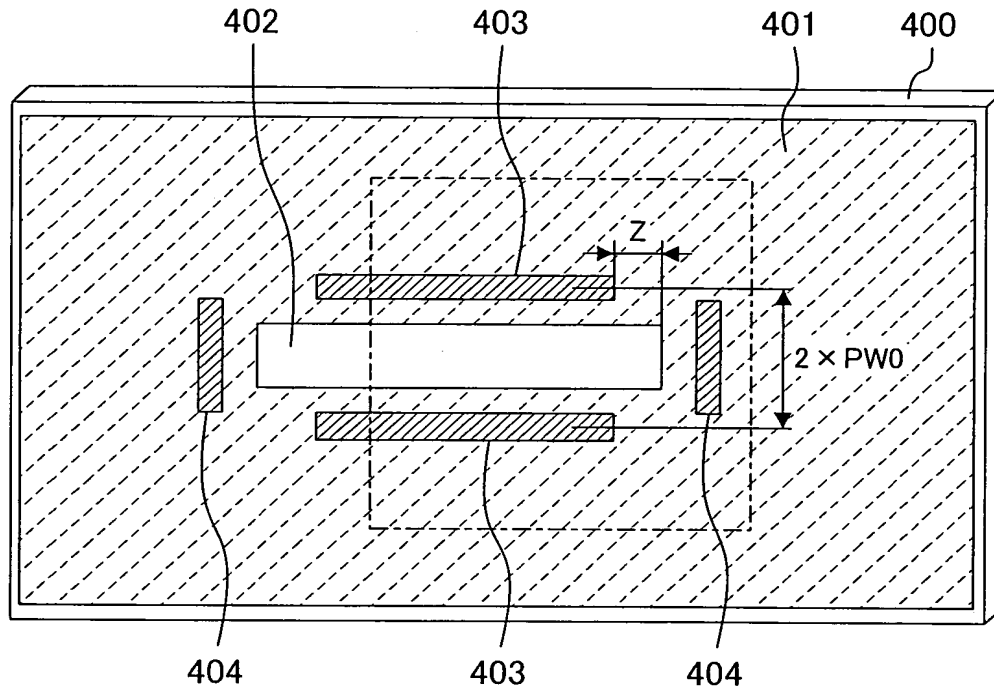


FIG. 21B

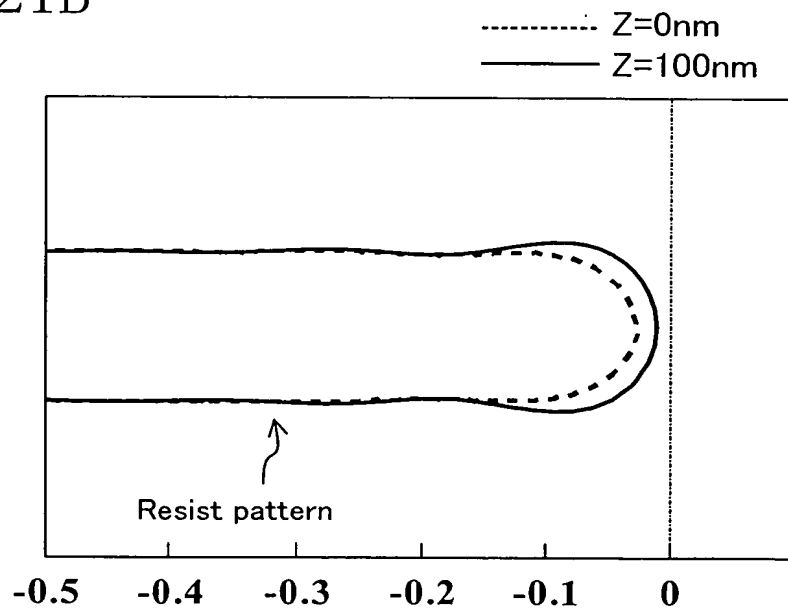


FIG. 22A

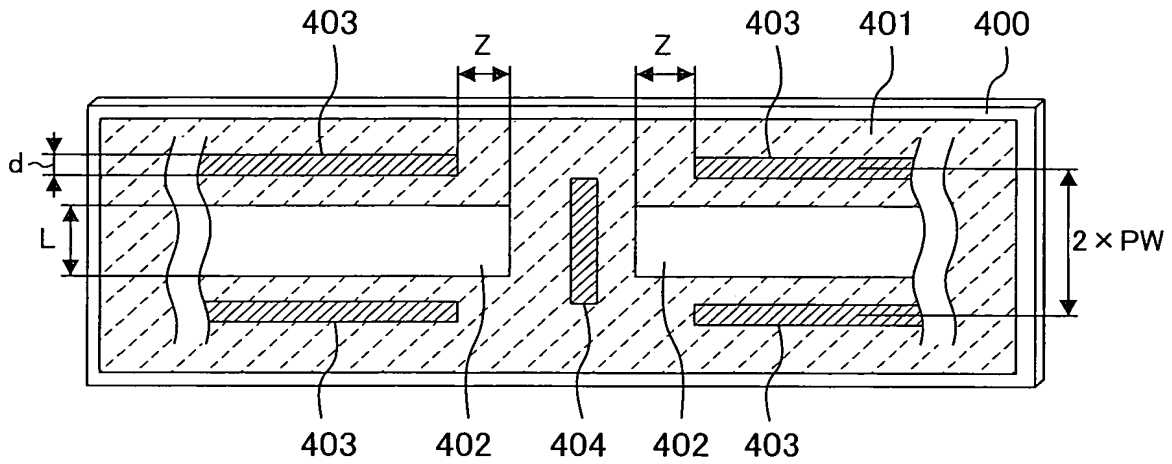


FIG. 22B

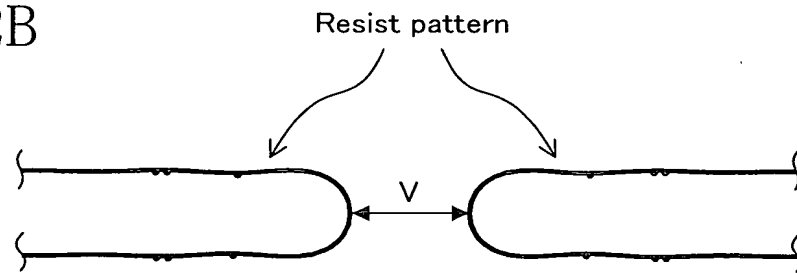


FIG. 22C

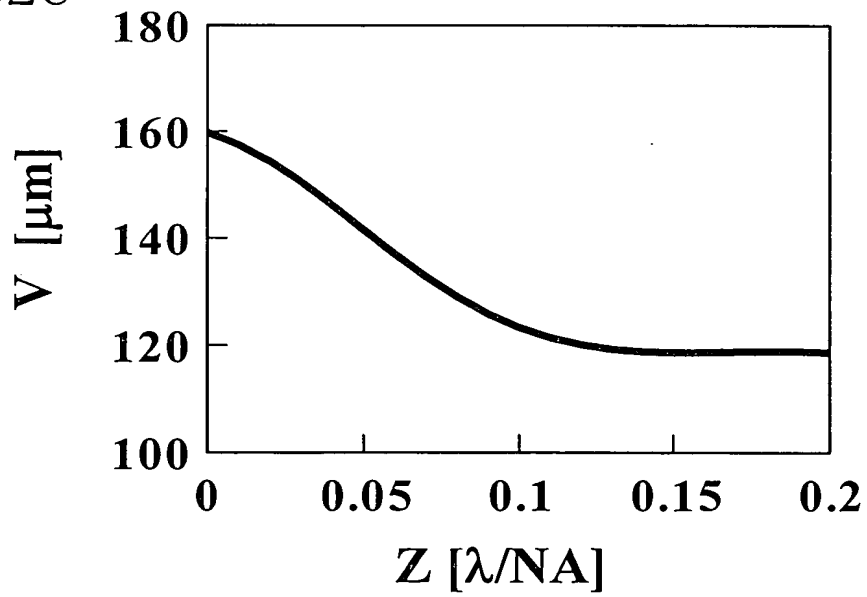


FIG. 23A

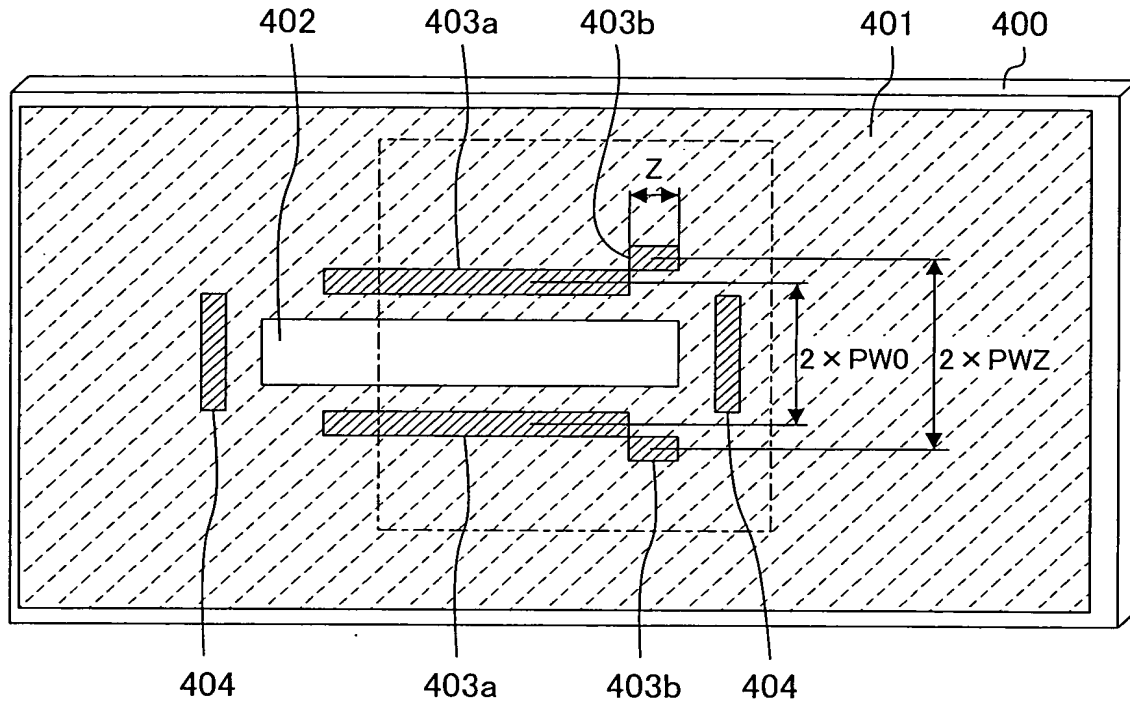


FIG. 23B

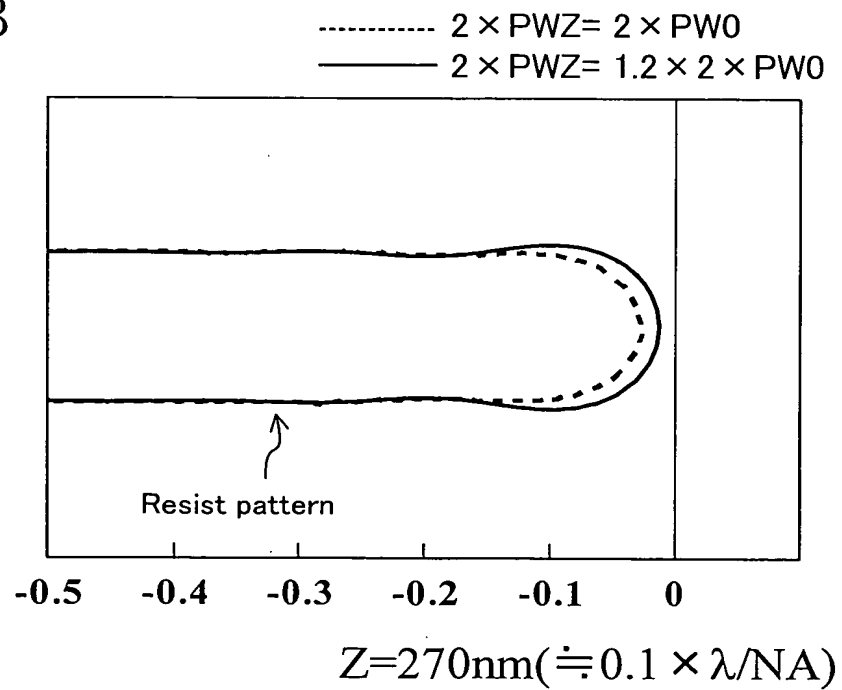


FIG. 24A

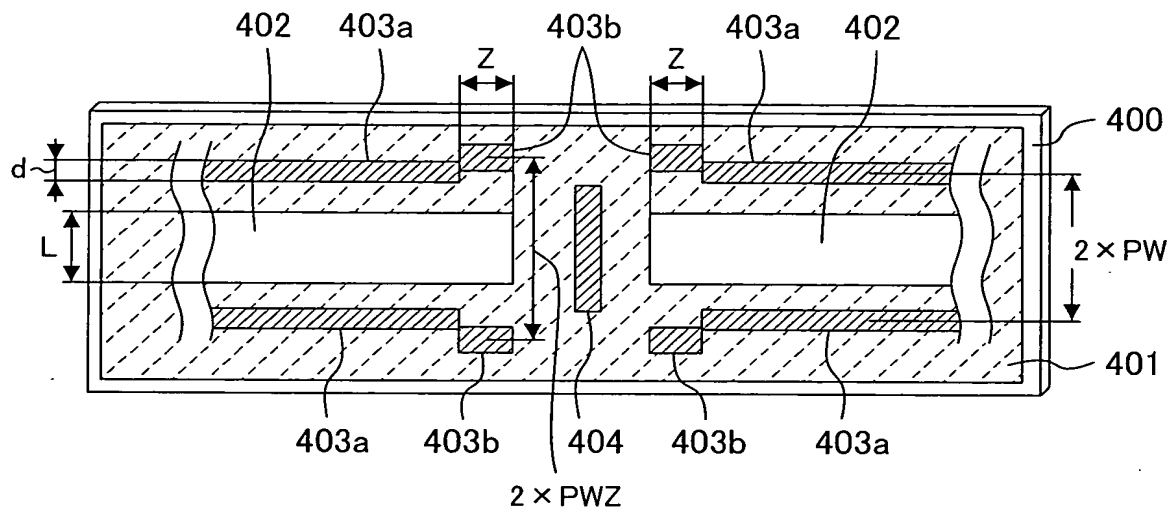


FIG. 24B

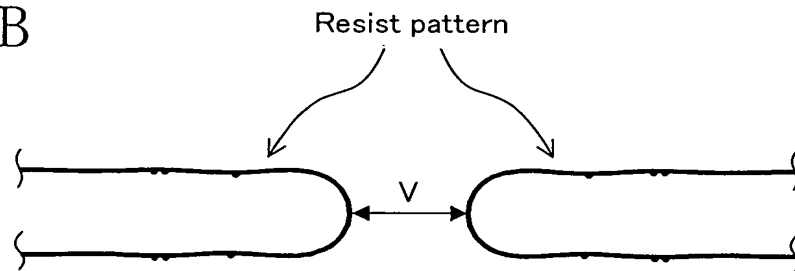


FIG. 24C

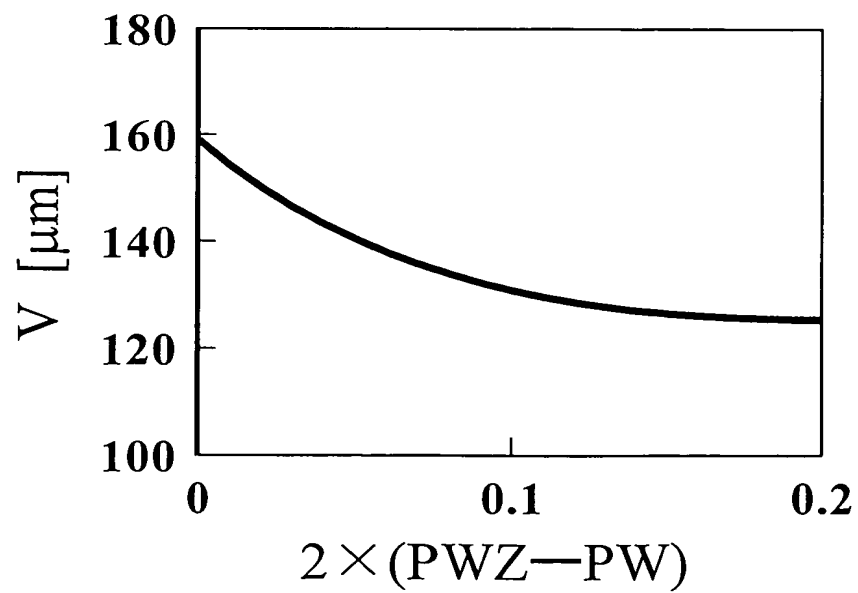




FIG. 25A

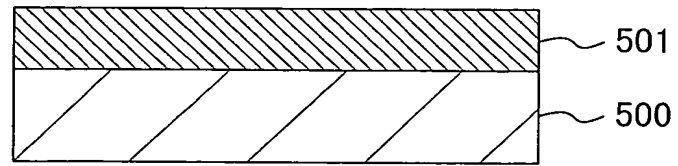


FIG. 25B

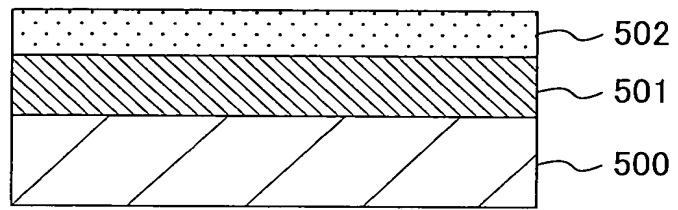


FIG. 25C

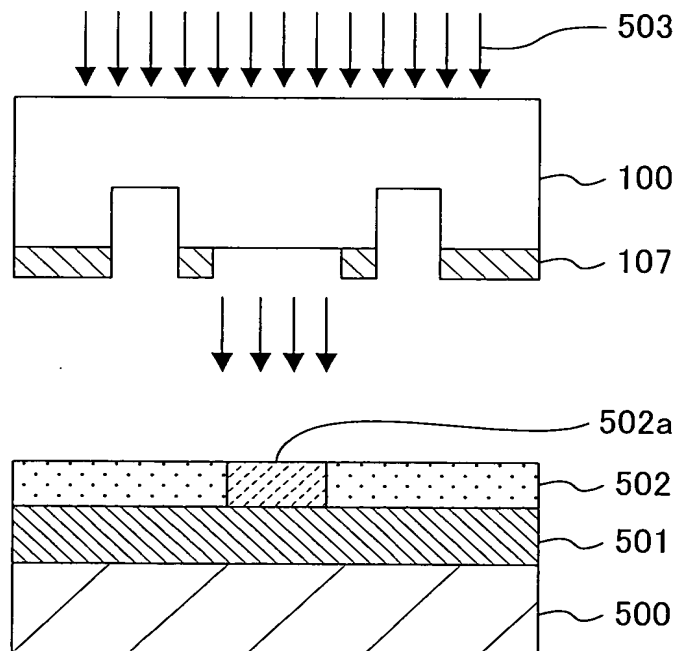


FIG. 25D

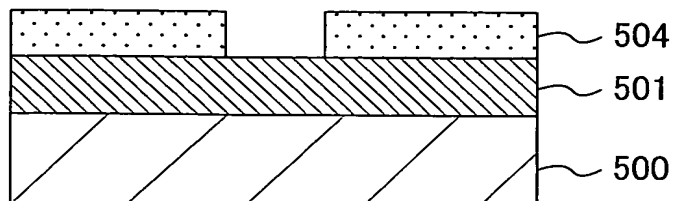
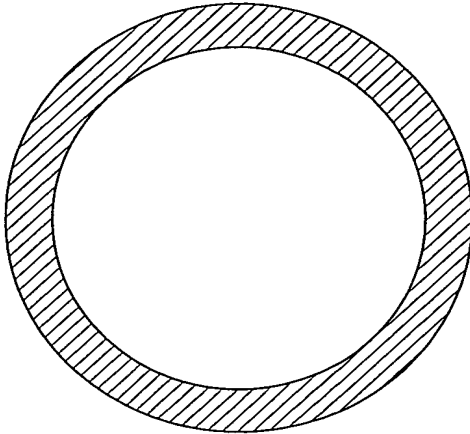
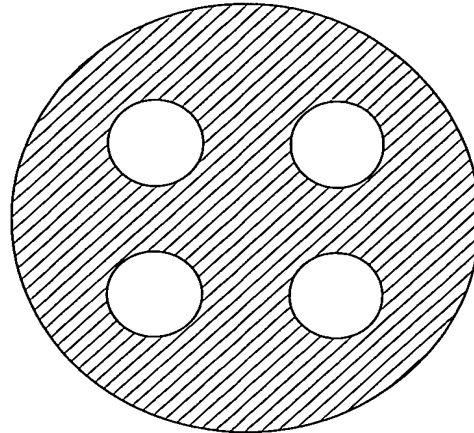


FIG. 26A



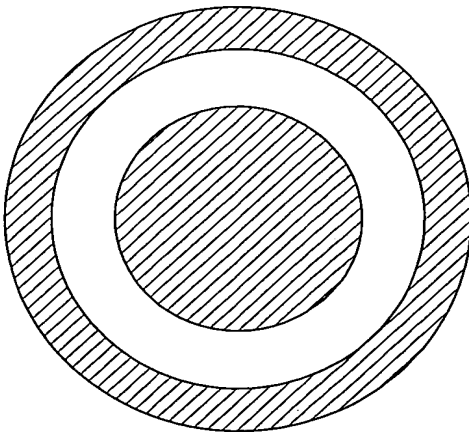
[General exposure light source]

FIG. 26C



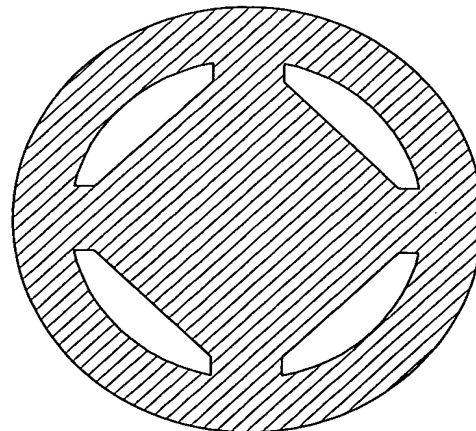
[Quadrupole exposure light source]

FIG. 26B



[Annular exposure light source]

FIG. 26D



[Annular/quadrupole exposure light source]

FIG. 27A

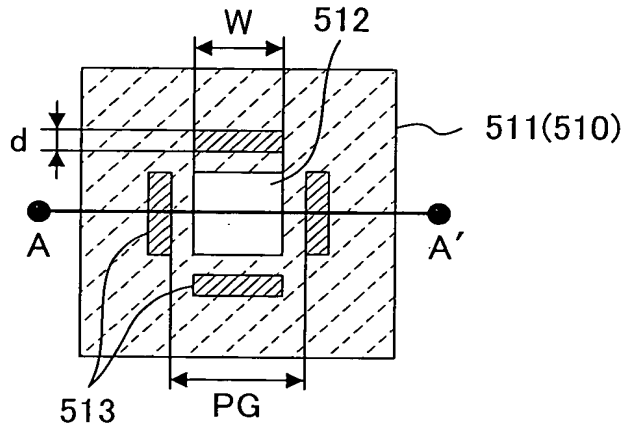


FIG. 27C

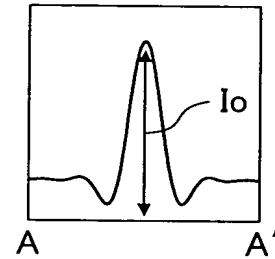


FIG. 27B

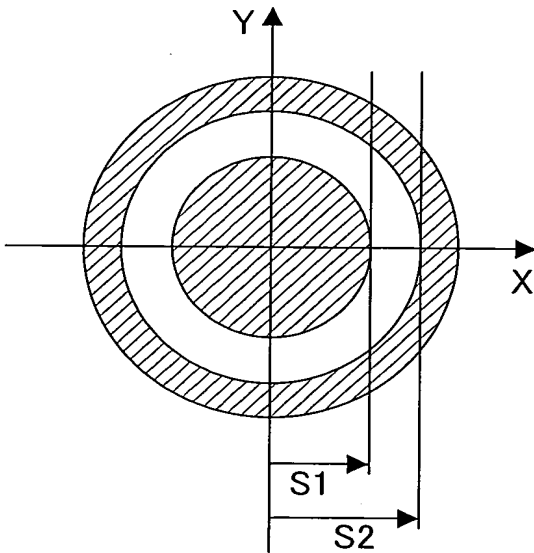


FIG. 27D

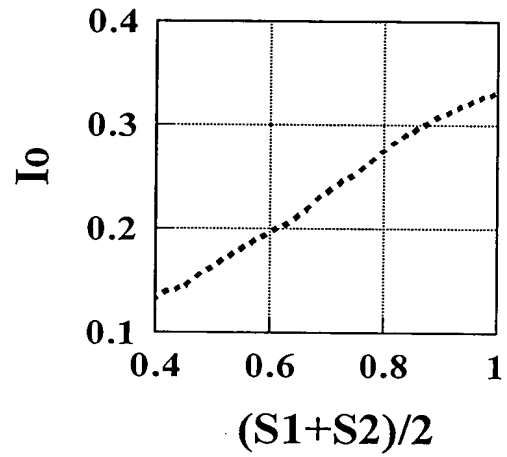


FIG. 27E

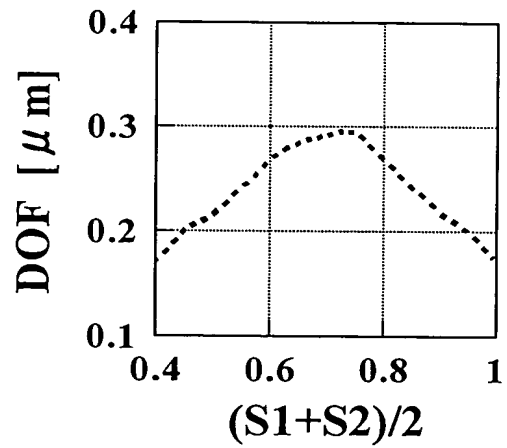


FIG. 28

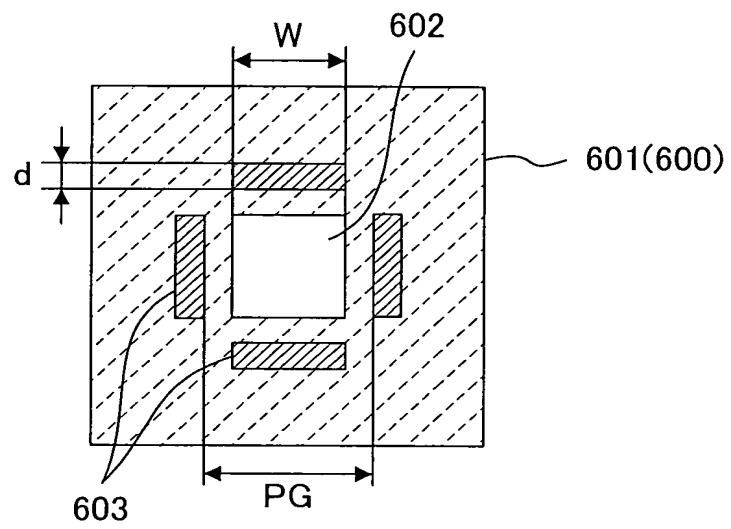


FIG. 29

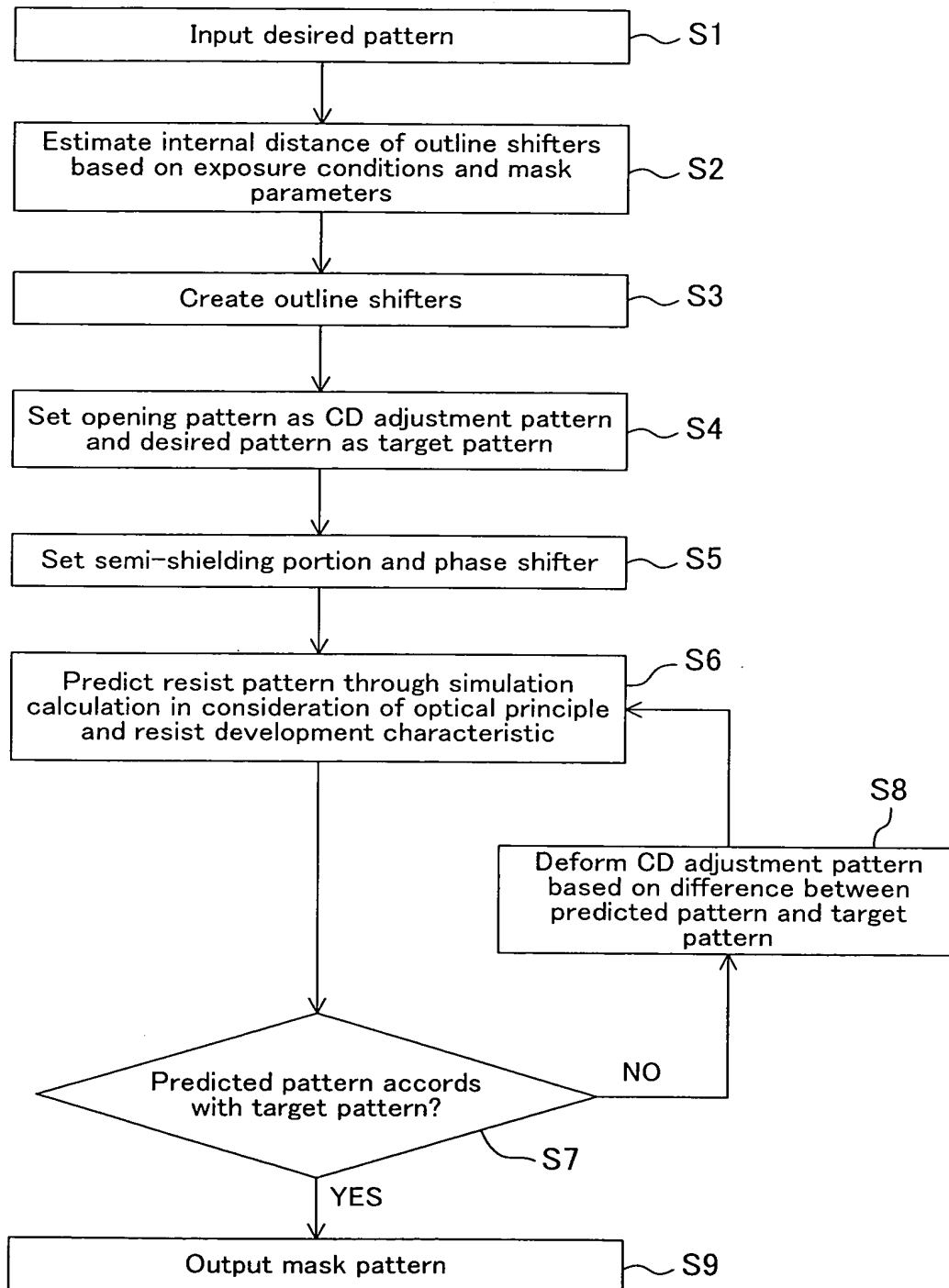


FIG. 30A

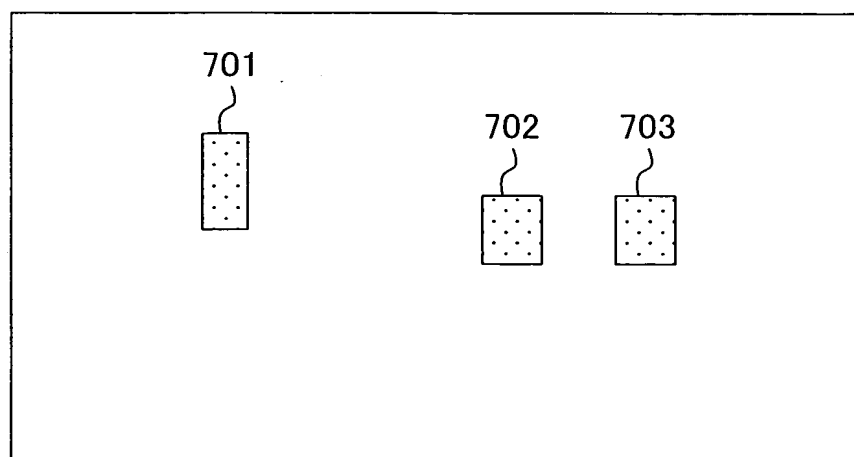


FIG. 30B

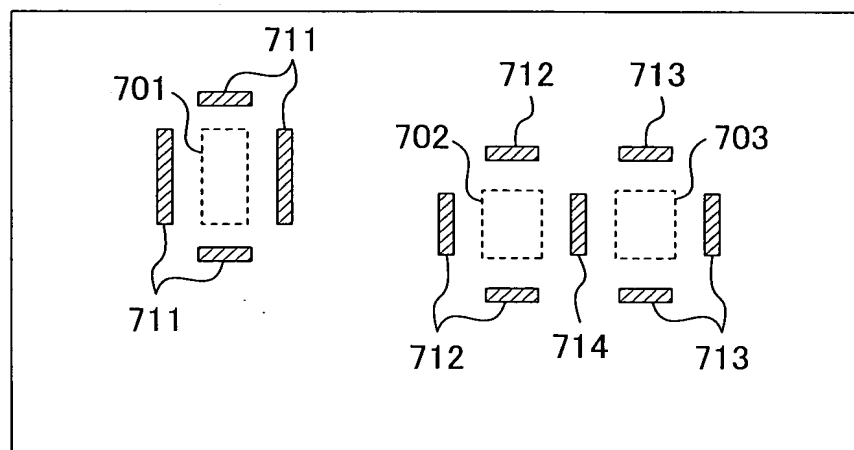


FIG. 30C

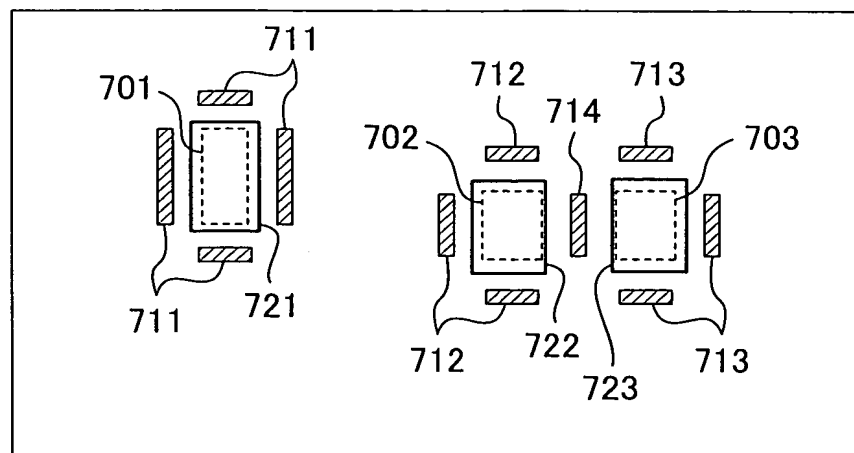


FIG. 31A

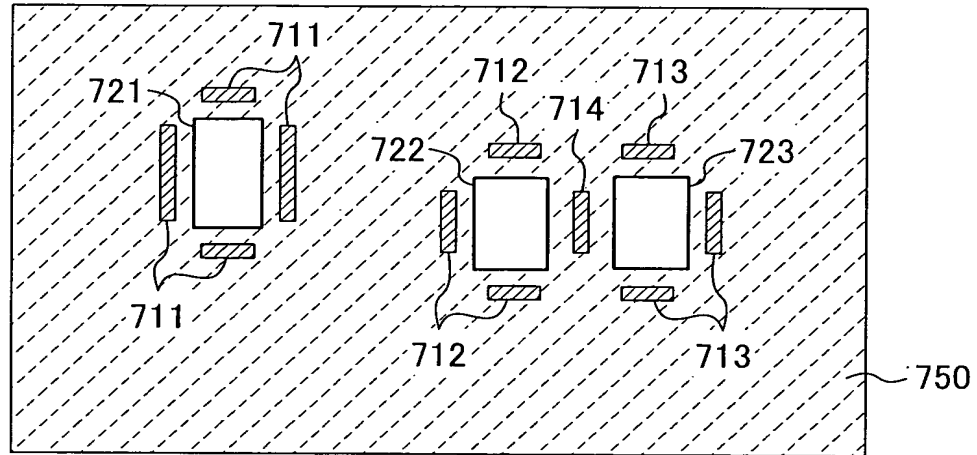


FIG. 31B

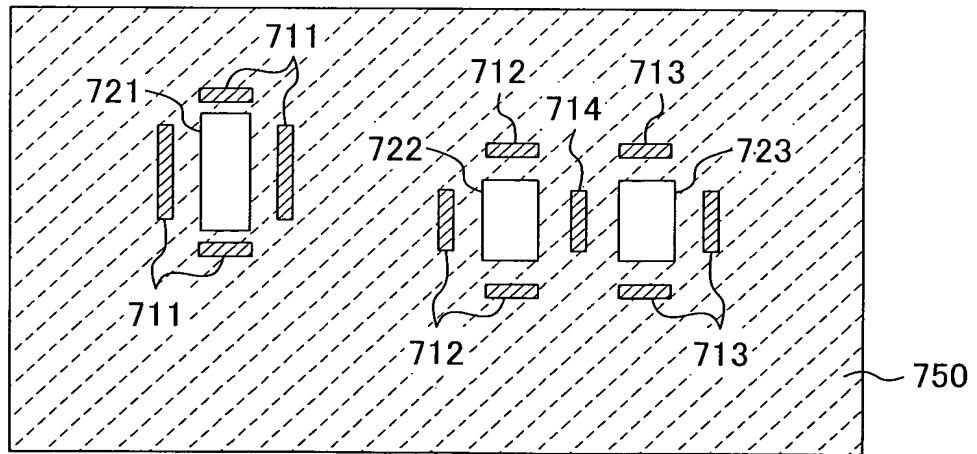


FIG. 32A  
PRIOR ART

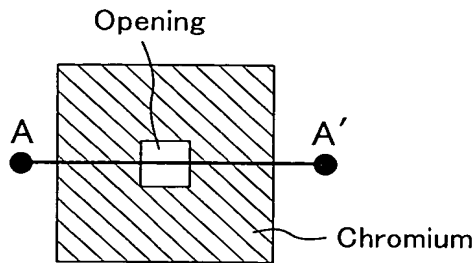


FIG. 32B  
PRIOR ART

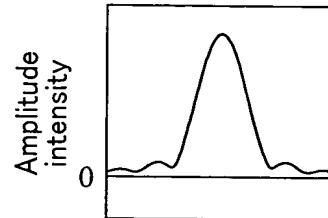


FIG. 32C  
PRIOR ART

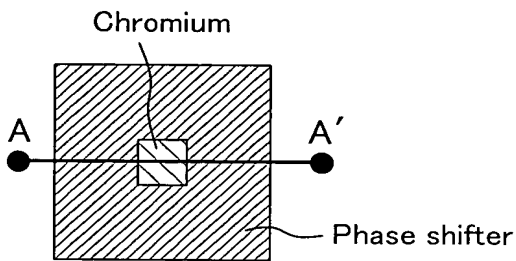


FIG. 32D  
PRIOR ART

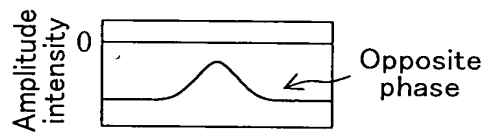


FIG. 32E  
PRIOR ART

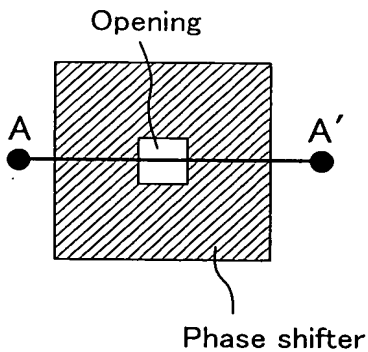


FIG. 32F  
PRIOR ART

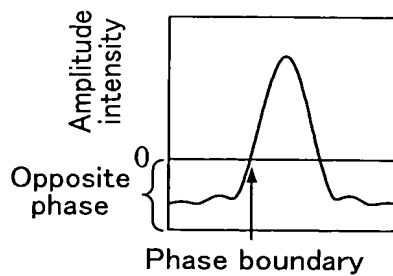


FIG. 32G  
PRIOR ART

